NOTES ON EPIDEMICS:

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NOTES ON EPIDEMICS:

FOR THE

Use of the Public.

BY

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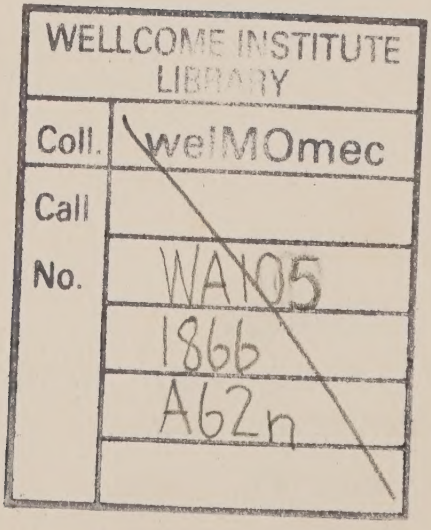

PREFACE.

THE following short treatise is an expansion of an article which appeared in the January number of the BRITISH QUARTERLY REVIEW, and I have naturally experienced some difficulty in adapting it to its present form. As the publishers, however, thought that some of the facts and arguments of the original paper were of sufficient public importance to deserve a more general circulation than could be obtained by a review article, I have willingly done my best to make this volume of use to general readers.

No one who lives in one of our great cities—and especially no Londoner—can have failed to notice the increased atten-

tion which is everywhere being given to the subject of Epidemic Diseases. As yet, however, this interest is but a vague sentiment with the majority; and I have been particularly struck, when conversing even with those gentlemen whose daily avocations bring them into constant contact with the classes amongst whom these maladies are chiefly developed and fostered, with the fact that, as yet, the bearing of sanitary laws upon the practical questions connected with prevention and mitigation is so ill-understood that it can scarcely be said to be known at all. Without pretending to write what the medical profession would receive as a valuable original work, a physician may supply the public with very useful information. The special source of my own interest in this matter is the great prevalence of typhus fever—one of the most deadly forms of

epidemic disease in London at the present day—in the immediate neighbourhood of the Hospital of which I am an officer; a prevalence which is so plainly artificial and needless that no medical man can observe it without mingled feelings of regret and indignation. The opportunity now offers itself for appealing to the public against that supineness which, fostered by a habit of over-weening confidence in our powers of local self-government, has induced Englishmen to neglect problems which are daily becoming of more vital consequence to the well-being of the State. No mistake can be more serious in its consequences than is the error of regarding the growth of infectious diseases as a matter of mere local or personal interest. That which is happening in the low "slums" of Westminster is happening also in hundreds of places where the conditions of daily

life are similarly unwholesome; and, unfortunately, the progress of those incidental evils which inevitably accompany a certain stage of civilisation is daily multiplying the centres from which infectious disease spreads through the whole community, and aggravating the evil where it already existed. To meet and check the mischief requires a national effort; but until the nation understands the elementary facts of the history of preventable disease its efforts will be wasted. How miserably ineffective our collective attempts at improvement have been will be shown in the following pages; nor can we wonder at the result when we find official bodies, which are charged with the gravest responsibilities as to the care of the public health, ignoring so simple a fact as the distinction between the contagious typhus of the destitute classes, and the utterly different fevers which depend upon insanitary

conditions affecting rich and poor almost equally.

The main object of this essay is to furnish information which may assist the non-medical public to do their part in the work of prevention. For the purpose of insuring that early *isolation* of patients which is absolutely necessary if infectious diseases are to be cut down at the roots, it is necessary that a knowledge of the value of the principal premonitory symptoms should be widely diffused among the public; and, accordingly, I have endeavoured to supply this want in the briefest and most intelligible manner. As far as possible, the descriptions have been limited to simple physical facts, and I have gladly availed myself of one important set of phenomena, which especially bear this character, namely, the changes of animal temperature, as tested by the thermometer, which have lately been

found to furnish most valuable information. It would be idle to attempt to convert the public into a body of skilled medical observers; but it is possible, and in regard to the present subject, most important, to teach them to perform, scientifically, those duties which devolve on the friends of patients, even before medical advice can be summoned; and, above all, to inform them of the real value of those symptoms which make it necessary that medical assistance should be at once obtained.

F. E. A.

Wimpole Street,
March, 1866.

TABLE OF CONTENTS.

CHAPTER I.

INTRODUCTORY.

Ignorance of the public, a source at once of unnecessary panic, and of mischievous neglect with regard to epidemic diseases—Essentially preventable character of these maladies—Definition of the phrase "Epidemic Disease"—List of British epidemics—General causes of epidemic disease—Mortality from epidemic diseases in London — Premonitory symptoms of epidemic diseases, with remarks on the use of the thermometer for the purposes of diagnosis. *Page* 11

CHAPTER II.

FEVERS OF DESTITUTION—RELAPSING FEVER AND TYPHUS.

Relapsing fever: its genesis simply from circumstances of destitution; its spread by contagion; its early symptoms. Typhus fever; caused by destitution *plus* overcrowding in dwellings; its intense contagiousness within a small area; the chief means of its propagation; pre-eminently a disease of *cities;* its early symptoms . . . . . *Page* 36

CHAPTER III.

EPIDEMIC DISEASES DEPENDENT ON INSANITARY CONDITIONS INDEPENDENT OF DESTITUTION—TYPHOID FEVER, CHOLERA, AND EPIDEMIC DIARRHŒA.

Typhoid fever, formerly confounded with typhus; really quite distinct—Predisposing causes—Exciting causes, chiefly arising from defects of drainage—Early symptoms of typhoid. Asiatic cholera: an opprobrium of medicine, but really more comprehensible,

as to its causation, than some much commoner epidemic diseases—Place of origin—Atmospheric influences—Propagation by sewage matters in drinking water, and by sewer-gases—Early symptoms of cholera. Epidemic diarrhœa; its relations to cholera; its causes: "dysenteric" form of epidemic diarrhœa. Measures of disinfection . . . . *Page* 70

CHAPTER IV.

INFECTIOUS EPIDEMIC DISEASES WHICH ARE COMPARATIVELY INDEPENDENT OF DEFECTIVE SANITARY ARRANGEMENTS.

Unsatisfactory state of our knowledge as to the causation of those diseases—Scarlet fever; a disease never known to originate *de novo*—Mode of propagation—Intense contagiousness—Precautionary measures—Early symptoms. Diphtheria; predisposing causes mostly *personal;* peculiar nature of contagion; early symptoms. Measles; cause not known; bad ventilation a source of great aggravation—Early symptoms of measles. Early symptoms of small-pox. Whooping cough; obscurity of original causes; mode of propagation—Non-febrile character of early symptoms; dangerous effects on weakly constitutions; danger of contagion. Influenza; uncertain origin; rapid propagation; infectious nature; early symptoms; essentially distinct from common catarrh; is often followed by serious constitutional diseases in weakly subjects. Brief note on yellow fever. General conclusions on the subject of epidemic disease. *Page* 125

NOTES ON EPIDEMICS.

CHAPTER I.

INTRODUCTORY.

THE British public has just undergone one of those panics which it suffers, at certain intervals, from the apprehension that Epidemic Disease of a terribly fatal kind is about to devastate the kingdom. The approach of the dreaded cholera raised in almost every mind vague terrors which the experience of exceptional years of pestilence has rendered traditional; and we were not unlikely to drift helplessly into mere paralysis, at the very time when we needed to have all our wits about us. Nothing is so effectual in calming the unreasoning fears of a time like the present, as the

investigation of our real knowledge of the evils which we dread; it is no slight gain if we learn to view the plague with which we are threatened as a scientific problem for inquiry rather than a subject for unreasonable terror. In the following pages, we shall endeavour to show that public sentiment has been unduly excited by the prospect of one kind of danger, at the very time when other matters of equal and, indeed, of far greater importance to the national health are neglected or ill understood. We propose to review briefly such conclusions as medical science has been able to announce with some confidence, with regard to the special forms of epidemic disease to which this country is liable; and it is needless to say, that in a popular treatise, such as this is designed to be, we must limit ourselves to those practical considerations, as to prevention and mitiga-

tion, in respect of which the general public have duties and responsibilities of their own to fulfil.

In one point of view these epidemic scourges of the earth, so far from presenting a specially gloomy aspect to the physician, are among the most tangible proofs to him of the reality and importance of his work. He boldly names them Preventable. He tells the impatient generation, which sees its ranks thinned by what seems an anomalous, incomprehensible, and irresistible power of destruction, that the time will come, and, indeed, is visibly coming, when the diseases which form the largest sources of mortality will be extinguished, or confined within narrow limits, by the enlarged resources of science. It may not be the lot of this generation, or of the coming one, to see this consummation; but the student of medicine gathers

omens of success in the future from past victories in this field which it is impossible for a layman rightly to appreciate; and his faith never wavers, even under the severest pressure of present disappointment. No one who is not imbued with the spirit of modern medical inquiry can understand the grounds of this confidence. For example, let us consider for a moment the now familiar phenomenon of the disappearance of intermittent fevers, in consequence of the drainage and cultivation of the marshy districts, which are their proper *habitat* and place of birth. To the public, the disappearance (in England, for instance) of these diseases, though in itself gratifying, suggests no increased confidence in the resources of medicine; for the local annihilation of the pest seems to have been as purely accidental as we dare call anything. The physician views the matter very differently. He looks

upon the whole series of facts observed in the case as a most useful piece of *analysis*, ready performed to his hand, of which he eagerly avails himself in speculating upon epidemic disease in general; and, in fact, there is no single recorded circumstance in medical history which has been more fruitful in suggesting thoughts which have led to practical results in preventive medicine. It is impossible to say how much of our improved knowledge of the mode of propagation of many diseases, and specially of typhoid fever and cholera, is not, directly or indirectly, due to the important considerations forced upon medical men by the events which have happened in regard to the extermination of ague by drainage. Certain it is, that reflection upon this circumstance had the greatest share in leading to what we shall hereafter notice as one of the very few thoroughly valuable

observations which have been made in regard to the propagation of cholera—the discovery by Dr. Snow of the frequent propagation of the disease by impure drinking-water.

Often, indeed, it has happened, that from the seemingly most desperate features of modern epidemics, there has directly originated the one all-important observation which has made possible a whole system of preventive *régime*. It needs but to study the history of the Irish Famine fevers, and the subsequent epidemics of typhus, to find an instance in point. We may safely say that the greatest discovery of this century, in regard to the causation of epidemic disease, as witnessed in Great Britain, arose out of the terrible circumstances of the dreadful Irish famine-pestilence of the years 1846 and 1847. Upon the persons of the unfortunate Irish, there were worked out, first, the great problem of the nature of

true starvation-fevers; and secondly, the differentiation of the true contagious typhus from the former. Such results as this, and the discovery of the propagation of typhoid fever through the medium of decomposing organic matters, are far more than mere medical curiosities; indeed, as we shall hope to show in the proper place, they form the true basis, not only for a greatly improved medical treatment of some of the most important British epidemics, but also for a most promising system of sanitary legislation, which can hardly be much longer delayed.

It seems necessary, in commencing the discussion of our subject, to clear up some elementary points with regard to the definition of terms. At the risk, therefore, of appearing to be superfluously minute, we must premise that by epidemic diseases we mean to specify those maladies which,

whether they habitually form part of the catalogue of the diseases of any country or not, are at intervals imported afresh from without, and take, more or less suddenly, a greatly increased development, both as to the number of individuals whom they attack and the proportionate mortality.

Of the human diseases of this class which have infested Great Britain and Ireland, the following is, for practical purposes, a complete list:—Plague, typhus fever, typhoid fever, relapsing fever, malarial fevers (including intermittents and remittents), sweating sickness, scarlet fever, measles, small-pox, chicken-pox, diphtheria, whooping-cough, influenza, erysipelas, puerperal fever, cholera, and epidemic diarrhœa.

It would be waste of time, however, to dwell upon all these diseases, because there are a few of them which, from their prevalence or their fatality, altogether out-

weigh the rest in practical interest. The malarial fevers are now only represented in this country by the agues which infest some marshy districts : and the deaths from this class of disorders are but trifling in number. Small-pox has, it is true, not altogether ceased to be occasionally fatal to considerable numbers, but we all clearly understand that nothing hinders its extinction but the difficulty of enforcing the universal use of vaccination. The plague and the sweating sickness are happily never known here now, though formerly so destructive. Chicken-pox is a trivial complaint. Erysipelas and puerperal fever do not come under the head of serious and widely spreading epidemics, and their outbreak in particular places (such as hospitals, &c.) is becoming less and less common now that the first principles of hygiene are well understood by medical men. The remaining

diseases, which are to form the subject of this paper, will be divided into three groups: in the first we shall place relapsing fever and typhus; in the second, typhoid fever, cholera, and epidemic diarrhœa; and in the third, scarlet fever, diphtheria, measles, whooping-cough, and influenza. We shall take as our text-books the learned works which represent the most recent medical science; without pledging ourselves, however, to do more than indicate what seems to be the balance of probabilities derivable from a comparison of the opinions expressed therein.

Before speaking of special epidemic diseases, it will be well that we say a few words as to the *general* causes of this kind of sickness, amongst which we must seek for the special sources of particular epidemics. These are either *constant* or *occasional* in their operation. The first kind can be

easily illustrated by the conditions which prevail where the low-lying delta of a slowly flowing river has become the depository of a great quantity of decaying organic matter, or by the state of things which exists when sewage matters habitually contaminate drinking water, or sewer-gas always mixes in large quantity with the atmosphere. In all these examples we see elements (though not all the elements) of epidemic disease, lying constantly in readiness for mischief. The *occasional* causes may be illustrated by the influence of changes in the atmosphere (particularly as regards temperature, moisture, and the rate of movement of the air), and by the various circumstances which may produce distress and privation of food among large numbers of persons at a particular time. But by far the most important of these occasional causes is that influence which is known by

the name of contagion; this word expressing the idea of the communication of a material substance which can excite the disease in the body. Our readers are probably aware, that modern writers for the most part associate with the idea of contagion the further theory that the communicated poison is of the nature of a *ferment*, and that the characteristic disturbances which it sets up in the organism are due to a kind of *fermentative* movement; hence the name "Zymotic (or fermentative) diseases." During the fermentative process, the secretions of the infected person become charged with matters, which in their turn are capable of setting up the zymotic process in healthy organisms: these matters are sometimes volatile, and sometimes not, or they may have very different degrees of volatility; and upon these differences depends the distance to which the atmo-

sphere round an infected person will be charged with the pernicious influence. But even in the case of the non-volatile zymotic poisons, infection may be conveyed by the direct application of the morbid matter to a part of the body from which it can be readily absorbed into the blood; as by the application of small-pox or cow-pox matter to a wound, or by swallowing the vitiated secretions from patients suffering from typhoid fever or cholera. Lastly, it must be noted that many of the best observers believe that some diseases which are not contagious are yet dependent on the action of a zymotic poison; as, for instance, the ordinary English agues.

As regards the nature of the several zymotic poisons, little more is known than that they are probably organic in their chemical composition: but it may be said that the belief rather gains ground, that

in their active state these morbid matters consist of or contain living organisms. This question, though far too little elucidated to permit of detailed argument, has most important relations to the question—whether all or any of the zymotic diseases are capable of being produced *de novo*, and in the absence of specific germs derived from existing cases of the particular disease. In a treatise like the present, it is impossible to do more than to point out, in treating of individual diseases, the evidence which bears most strongly on this disputed question.

In order to give a general idea of the importance of those epidemic diseases which we propose to discuss, it may be well to quote here the evidence afforded by the Registrar-General's abstracts of the mortality in London for the thirteen years from 1852 to 1864, inclusive. These returns show that in that period of time, the mor-

tality in London, from all causes, was 719,958. In the same period, the mortality from "zymotic" diseases was 218,998. Of these deaths 41,664 were caused by scarlet fever or diphtheria (these two diseases are not accurately separated), 18,256 by measles, 26,892 by whooping-cough, 13,160 by cholera (10,708 of these in the single epidemic of 1854), 29,995 by diarrhœa, and 31,937 by "typhus" (including not only true typhus, but relapsing fever and typhoid), and only 1,168 by influenza; no serious outbreak of the latter disease having occurred within the years specified.

We shall conclude the present chapter by mentioning some circumstances which may give warning of attacks of epidemic diseases, and may often enable friends of patients to form a rough, but serviceable, estimate of the probable gravity of the impending affection.

Of the diseases which we are about to discuss, some are, and some are not, *febrile* in the manner of their commencement: of the former class are typhus, typhoid, relapsing fever, scarlet fever, measles, and influenza; diphtheria may be said to hold a half-way position; while cholera, epidemic diarrhœa, and whooping-cough belong to the non-febrile class, as regards the way in which they begin.

The febrile kind of epidemics usually announce their attack by striking premonitory symptoms. In all of them, if the affection run at all a typical course, there is a period of greater or less duration, a few hours or a few days as the case may be, between the exposure to the infecting poison and the outbreak of distinct symptoms: but usually for some time before the latter event the patient loses his appetite, and experiences, and shows in his looks, an unaccountable

depression. This culminates most commonly in a burst of shivering, not unfrequently accompanied or followed by vomiting; a chilly feeling lasts for some time, and then gives way to sensations of unusual and steadily-increasing heat, till that burning state of the skin is attained which is popularly thought to be typical of fever; there are the greatest differences, however, between different diseases, and even between different cases of the same disease, as to the degree of *flushing of the face.*

Whenever a patient shows such symptoms as these he should be at once isolated in an apartment, possessing not less than 1,500 to 2,000 cubic feet of space, and with the freest means of subsidiary ventilation: unless the weather be very hot there should be a fire, and the windows must be constantly open. No bed-hangings, curtains, or carpets should be allowed. This

is more especially necessary if, among the symptoms, there has been sore throat—and the patient has never had scarlatina,—or severe pain in the back and sickness, and the patient has been exposed to small-pox,—or if there be great nervous prostration or delirium, and the patient has been within the possible range of typhus contagion. The most anxious watch must now be kept upon the skin, and the appearance of anything like an *eruption*, especially if it comes out on several parts of the body, should be the signal for summoning medical advice, even in cases where the preliminary symptoms may have been ever so mild. The time of appearance of the eruption varies from twenty-four hours to nine or ten days, from the commencement of the febrile symptoms, in the various febrile diseases: and, in relapsing fever, there is never any specific eruption

at all. Besides this, there are many instances of the complete, or almost complete, absence of eruption, even in scarlet fever and other epidemic diseases, which are ordinarily accompanied by a rash. Some more early and certain criterion of the nature and seriousness of the disease is, therefore, a great desideratum for the friends of the patient, and, fortunately, we are now in a position to suggest one test of this kind, the value of which is very great.

Recent medical observation has placed in our hands a means of distinction between different febrile maladies, and a most useful calculus of the gravity of an existing disease, which we must here specify, viz., the thermometer.

It has long been known that the healthy human body possesses the remarkable property of retaining an almost complete

equality of temperature in its deeper parts, under all the varying circumstances of external cold or heat. The temperature of the arm-pit, for instance, which is a part protected from the influence of external changes, remains always, during health, at the level of 98° to 99° Fahrenheit. And this is taken as the standard in the ordinary circumstances of life in temperate climates. In severe diseases of many kinds (not merely in fevers) this standard is exceeded, sometimes even to the extent of eight or nine degrees; and it is a singular fact that this increased heat begins to be manifested to thermometric observation even in those early stages of acute diseases, when the patient's own delusive sensations would lead him to believe that there was a great reduction of animal heat, as, for instance, in the shivering fit which forms the first stage of an attack of ague.

From the large number of observations which have been made by Wunderlich and many other continental observers, and in our own country by Dr. Sidney Ringer and Dr. Aitken, the following facts stand out as pre-eminently valuable in the appreciation of the character of acute diseases. If the thermometer rapidly rises as high as 101° to 105° Fahrenheit, the degree of fever may be known to be *severe*. When the temperature exceeds 105° the complaint is dangerous to life, and the danger increases rapidly with every successive degree of added heat. On the contrary, if during the first two or three days of illness, the temperature never rises above 100°, the complaint is probably a trivial one, whatever its exact nature may be. On the whole, it is a good rule for the guidance of the public that a temperature exceeding 100 degrees, however mild may be the

general symptoms which the patient may present, is a proof of the necessity of immediately applying for medical advice.

These leading facts are sufficient to show the *general* importance of thermometric observations; and we shall endeavour to show, in treating of particular epidemic diseases, the more special items of information which may be gained in this way. The thermometer is an instrument which for many important medical purposes is as necessary to non-professional persons as to medical men; it remains for us now to indicate the precautions which must be observed in its application.

The kind of instrument which must be used is that with a naked bulb, and a white backing to its stem, on which the degrees are marked; Mr. Casella, of Hatton Garden, makes very good ones of this kind, which are generally adopted by medical

men; but cheaper instruments, of German make, can be obtained from Griffin, 22, Garrick Street, Covent Garden.

The "Self-Registering Maximum" form of thermometer is the most convenient for the use of non-professional persons, who are not accustomed to the daily employment of the instrument; the purchaser should obtain from the maker full instructions as to the adaptation of the index or register. No observation should be made till the patient has been quietly resting in bed for at least an hour. The bulb of the thermometer should then be placed deeply in the arm-pit, the arm being folded across the chest, and the bed clothes so arranged to cover the projecting stem as high as the marking of 90°, or thereabouts. The patient must lie perfectly still for at least 10 minutes; the thermometer may then be withdrawn, when the

register will remain stationary at the highest level which the mercury has reached.

A very slight amount of reflection will show the value of this mode of investigation in assisting the friends of a patient who exhibits so-called "feverish" symptoms, to a decision as to the propriety of taking some important steps, and particularly as to seeking medical help. It is absolutely necessary, however, that the application of the thermometer should first be practised on the healthy body, before we venture to rely on its indications in disease, even for these limited purposes for which alone laymen could be recommended to use it. The mother of a family should always be skilled in the application of the instrument, since nothing is more uncertain and delusive than the sensations of young children who complain of feeling ill, and the application of the hand to the skin is a very

poor and imperfect method of determining real temperature. In speaking of particular febrile diseases, we shall show that, besides the *general* information as to the gravity or triviality of a feverish disturbance which the thermometer can impart, it sometimes enables the observer, by its sole authority, to determine that a particular disease is or is not present.

The warning symptoms of those epidemic diseases whose commencement can hardly be said to present febrile phenomena at all, are so peculiar in the case of each individual disease that we can lay down no *general* rules for determining their nature or severity, beyond the fact of the prevalence or non-prevalence of the disease in the neighbourhood at the time. All other questions must be deferred to subsequent chapters.

CHAPTER II.

FEVERS OF DESTITUTION.

RELAPSING FEVER AND TYPHUS.

The three groups of epidemic maladies which we have already marked out, have been arranged in the order in which we have placed them, on the principle of commencing with those which exhibit the simplest and the most intelligible phenomena. Our first group contains two diseases,—relapsing fever and typhus.—which owe their origin, or at least their

developments, to scarcity of food, and to the various social miseries which follow necessarily in the train of such scarcity.

Relapsing fever may be described as presenting the simplest type, as regards its mode of origin, of any of the epidemic diseases; for it has been almost certainly proved to result directly from privation of food. The evidence seems remarkably clear and satisfactory. Every epidemic of the disease which has been recorded was preceded by extreme destitution of the poor, produced either by the failure of crops, or by some artificial circumstances which tended to throw large numbers of the lower classes out of employment. Unfortunate Ireland reckons it among the sad features of her history that she has been visited with terrible frequency by this disease; and the outbreaks have been always preceded by periods of severe distress, chiefly

from failure of the crops. But there is no monopoly of the disorder: wherever famine and want have prevailed in extraordinary degree, there relapsing fever has appeared. Perhaps the most fearful—as the most suggestive—narratives of this fever which we possess, are those of the Skibbereen and Mullingar epidemics in 1846 and 1847. Dr. Donovan, writing of the condition of the famine-stricken peasantry of Skibbereen, says, "The skin exhaled a peculiar fetid odour, and was covered with a brownish filthy-looking coating, almost as indelible as varnish: this I was at first inclined to regard as incrusted filth, but further experience has convinced me that it is a secretion poured out from the exhalants of the body." And Mr. Kelly, speaking of the same phenomenon at Mullingar, says, "Its smell was peculiar, not fetid or heavy, but somewhat like burning straw,

with a musty odour; and, strange to say, there was not a single pauper in the workhouse, with whom I had any intercourse, that did not evolve a *similar odour* when heated, even by the slightest exertion." Together with these repulsive symptoms there were others which, as Dr. Murchison remarks, strongly recall the phenomena noticed in the observations of Holland on the state of the starved poor in Manchester,—viz., emaciation, languor, listlessness, despondency, and giddiness; followed by staggering, dimness of sight, delirium, stupor, and coma; or by quick pulse, flushing of the skin, dry tongue, intolerance of light, neuralgic pains, and delirium; all the secretions of the body becoming at the same time vitiated. It is in such circumstances that the fever is *generated*, but once established it assumes a contagious character, and may spread to those who are not them-

selves in a state of destitution, though for this purpose very intimate communication with the sick appears to be necessary. The fever derives its name from the fact that the original access lasts only a few days, and then subsides; but, subsequently, relapses very frequently occur: there is no specific skin-eruption, and the mortality fortunately is but small.

The symptoms of an attack of relapsing fever are remarkable for their sudden occurrence and their early intensity. Severe shivering, chilliness, and frontal headache not unfrequently develop themselves as the earliest signs of positive illness; and great febrile excitement, indicated by great heat of the skin (102° to 107° Fahrenheit by thermometer in arm-pit), intense thirst, flushing of the face, and very rapid pulse is conspicuous even within the first day or two; to these is soon added, in the

great majority of cases, violent and repeated vomiting of a greenish bitter fluid. Very soon pains in the muscles and joints are also nearly always present: and when these pains are especially manifested in the back they form, together with the vomiting, a source of doubt as to whether the malady may not ultimately turn out to be *small-pox* —a doubt which sometimes cannot be laid to rest until the fourth or fifth day (inclusive), from the commencement of the symptoms, has passed, by which time the characteristic eruption of small-pox would probably have appeared. There are two symptoms, however, which very commonly present themselves, even in the early stages, which are highly diagnostic of relapsing fever (when combined with the intense febrile excitement already described), namely, *oppressed and anxious breathing*, and *jaundice of the skin and eyes*. And, if to these are added

fits of sweating which bring no relief to the febrile heat of the skin, the probability of relapsing fever is greatly increased. Along with all these symptoms, even when they are severe, there is a much less degree of prostration than occurs in the early stages of typhus.

The above phenomena, occurring in an extremely destitute person, would at once make us almost certain of the nature of the disease; occurring in a well-nourished individual, their value would depend chiefly on the amount of probability that the sufferer had come in personal contact with individuals infected with relapsing fever. The early symptoms are so severe that no sensible person could long delay applying for medical advice.

Such, in brief, are the early symptoms of uncomplicated relapsing fever—the fever of pure starvation; a disease which has

been recently forced upon our attention, at the time of the alarm of the so-called "plague" in Russia; on this occasion, as in all others, the cause of the epidemic was obvious.

Given, now, a set of individuals much in the condition, as to bodily nutrition, of the candidates for relapsing fever, it needs but one accidental circumstance, apparently, to procure the outbreak among them of a far more formidable malady,—the true typhus, —British typhus, as it has often been called, from the frequency with which it prevails in our islands. Abundant evidence has been adduced to illustrate the "predisposing" and "exciting" causes, to use the ordinary medical terms, of this terrible disorder. In the first place, typhus, like relapsing fever, is pre-eminently a disease of the poor. It is saddening to reflect upon the ignorance which has prevailed,

among the public, as to the history of this disease; an ignorance which is well marked, by the general tendency to confound it with typhoid fever,—a disorder which, as will be shown presently, owns a widely different parentage. Typh*us* fever is the curse of our large over-crowded cities, as typh*oid* is of our primitive, innocent hamlets, and our gossiping, ill-drained country towns; and everything about the two diseases, their causes and symptoms equally with the limit of their range, is widely distinct in the two cases. Typhus first makes its "nest," to use a cant word which is dismally prevalent just now, in the courts and alleys inhabited by the very poor. Unlike relapsing fever, it is a very mortal disease; and, moreover, the contagion is much stronger than that of relapsing fever. It is most unquestionably fostered or discouraged, according to the

destitution or prosperity of the population: on this point it is very instructive to contrast its frightful ravages in the crowded Lancashire districts, among the poor Irish after the famine of 1847, and its non-appearance or trifling development among the sufferers from the recent Cotton Famine, who had the benefit of an abundant and pervading charitable assistance, which precluded anything like starvation on the large scale. Very many similar instances might be produced, showing the same influence of good nourishment, in enabling a population to resist the attacks of this terrible disease, and *vice versâ*.

If famine be the great predisposing cause of typhus, over-crowding is something more; for there is much evidence to show that it can actually excite the disease in destitute persons. In regard to this, the various synonyms under which

typhus has been described at different times are highly suggestive: the old terms—"jail distemper," "camp fever," "hospital fever," and the like, point to instances in some of which, no doubt, the disease was only fostered by crowding and deficient ventilation, but in great numbers of which typhus was probably actually bred from the circumstances of the time and place. It is, of course, impossible here to recite the evidence for and against the doctrine of typhus-generation *de novo;* but as a typical instance of the class of facts which lead us to affirm the theory, let us hear a narrative by Dr. Murchison. "Again, after a complete absence of typhus for six months, several cases occurred in the spring and summer of 1860. I visited the localities whence all the first cases came. Several came from a court at Limehouse, where the fever originated in an underground

cellar, containing 912 cubic feet of space, with one window, which was never opened. This cellar was inhabited by eight persons (114 cubic feet to each), who were in a state of great destitution. There had been no fever before in the court or neighbourhood; but from this cellar it spread by contagion to several other houses in the same court. Another group of cases came from Pump-court, White Horse-alley, Holborn. A family, consisting of father, mother, and four children, of the respective ages of eighteen, fifteen, eleven, and nine, inhabited a room on the ground-floor, whose dimensions were . . . . 1072 cubic feet. All six slept in this room, so that each had only 178 cubic feet of space, which was still further diminished by a great accumulation of furniture. . . . . In the night, when the beds were let down, the floor was literally covered with furni-

ture. There was one door and one window; the door was always shut at night, and the window-shutters closed. The window looked into a court, a yard and a quarter wide, on the other side of which was a high wall, and beyond this a range of high houses. The family had resided in this house for many months, and had latterly been in very reduced circumstances, owing to the father being out of work. Four of the six took typhus, which at the time was unknown in the neighbourhood, and indeed was only met with in one or two distant localities throughout the metropolis. In a third case investigated, the circumstances were very similar." Take another example, which has come under our own eyes within the last few weeks. There is no quarter of London in which typhus has raged with more fatal effect than in the low "slums" of Westminster.

One spot in particular, has been long indicated by the medical officers of the parish as peculiarly fruitful of this disease, and, at the request of one of these gentlemen, we lately paid it a visit. "Smith's Rents" and "Smith's Place" are two miserable courts situated to the north of Victoria Street, the first running out of a main street, the second turning out of the first at a right angle, and leading to nowhere, a mere *cul-de-sac* in a wilderness of backs of houses. All the tenements in these two courts are miserable two-storied buildings, with no through-ventilation, each story consisting of a single room, inhabited by at least one family: the two floors united by a narrow staircase, so cranky and winding that it is a matter of difficulty to ascend it. The average total space allowed for each inmate does not exceed 180 cubic feet, and it

is greatly less than this in individual instances. We particularly inspected a house in Smith's Place which had already yielded seven cases of typhus within about as many weeks. The patient whom we went to see was a boy of about nine years of age; he was one of a family of seven, who inhabited a ground-floor room, one of the foulest and most stifling apartments we ever entered. The only aperture (except the front door) for light and air was one window, about 3 feet square—a casement which could only be partially opened: the whole room reeked with the odour which any medical man would at once recognise as that of typhus. In correspondence with the general air of squalor which distinguished this house are the sanitary arrangements, common to the whole of Smith's Place: the whole court, containing nine houses, is provided with two filthy, ruinous water-closets, in a state

of nauseous impurity which it is impossible to describe, and with *no water supply* (the water having been cut off, nobody could tell how or where, some weeks previously), and one dust-bin, open at the top, which is emptied on an average once a month!

In Smith's Rents we visited three typhus patients who were even worse off; they were lying in a room on the upper floor, the staircase leading to which was about two feet wide; the room was inhabited by five persons, who each enjoyed an allowance of about 95 cubic feet of space; there was only one small window, and the apartment stank so as to produce the most violent nausea in those entering it from the outer air. These descriptions might be multiplied indefinitely, from the experience of the last three or four years. It is a melancholy fact that typhus, which was

formerly a disease of only occasional occurrence, has become, to all appearance, a permanent fixture in London; and those who know most of the haunts of the disease will find great difficulty in explaining this, save on the principle that the aggregation of the sufferers rules the intensity and spread of the disease. Overcrowding in the low parts of our great towns necessarily implies much more than the mere concentration of human exhalations. It destroys feelings of self-respect among the poor, and leads them to neglect cleanliness, and thus the foulness of their apartments is aggravated. Typhus fever, generated in or imported into dwellings of this class, assumes a very intense degree of contagiousness; but the nature of the contagion is peculiar. Its operation is intense within a small range of distance round the infected object; but at a greater distance, or when the

poison is diluted with free currents of pure air, the bystander encounters but small risk. In the stifling rooms of the poor in our great cities, the whole air is full of poisonous exhalations; and, moreover, they cling to the furniture and walls of the apartments; so that unless a room of this kind be thoroughly disinfected by washing, lime-whiting, and the freest ventilation after a typhus patient has occupied it, it is a most dangerous residence for any susceptible individual. The clothes of the sufferer are also capable of conveying the disease. But except by the contagion of personal intercourse, the fever *rarely spreads* even from room to room, far less from house to house; and this accords exactly with the experience of the London Fever Hospital, in which, the typhus cases being kept in separate wards which are highly ventilated, the fever never spreads to other parts of

the building; whereas in those general hospitals which still continue the plan of mixing typhus cases with others (in wards which it is impossible to ventilate up to the proper typhus mark), the disease has often spread with serious effect.

A remark must here be made which is of the greatest consequence. The attention of hospital committees ought to be directed to the crying necessity which exists for the establishment, at every general hospital, of separate wards devoted to the isolation of cases of the more contagious fevers, and especially of typhus. In our view of the case it is difficult to apply terms of reproach sufficiently strong to the practice of mixing cases of a powerfully contagious fever with patients who are suffering from miscellaneous diseases. One has only to state the case to show the impropriety of the proceeding. A poor person, suffering, perhaps,

from a quinsy, or some other disorder in which there is no likelihood of any other result than a speedy recovery, is admitted to a hospital, and, while he is lying defenceless on his back, the authorities place in the next bed to him a typhus patient, who communicates to him a fatal disease of which he dies. This is no fancy statement of the case, it is what has happened over and over again during the progress of typhus-epidemics, and especially during the great epidemic which has now for so long a time raged continuously in London. It may be said that a simple remedy for this kind of mischance would be the exclusion of all cases of the more contagious fevers from general hospitals, and, in fact, some hospital physicians have proposed to adopt this course rather than expose their other patients to the unjustifiable risk of contracting a highly mortal

disease. But, in the first place, until the parishes do their duty in the manner which we shall presently point out, it is vain to suppose that the single fever hospital can possibly accommodate all the cases of highly contagious fevers which are, or ought to be, treated in hospitals. And, secondly, it must every now and then happen, even where the greatest care is exercised, that a person will be admitted who is supposed to be labouring under some ordinary complaint, but who is, in truth, infected with typhus, or some other highly contagious disease which is in a *latent* condition. Under these circumstances it is a matter of the highest importance that there should be the means of immediately separating him from the non-febrile patients when the real character of his complaint declares itself. Formerly a notion prevailed that the aggregation of several cases of infec-

tious disease within the same ward was in itself an extremely mischievous thing, as tending to concentrate the poison and intensify its malignity. This is now known to be a fallacy, when taken as a general proposition. It is quite true that the poison of contagious fevers becomes highly dangerous when it is diluted with less than a certain quantity of atmospheric air. But by allowing a large amount of cubic space (1,500 to 2,000 feet) to each patient, and providing for the free circulation of currents of air, the concentration of the poison may be entirely avoided, even in a ward which contains thirty or forty typhus patients. More than this; it may be broadly stated that it is impossible, in a ward which contains miscellaneous patients, some of them suffering from inflammatory diseases to which anything like draughts of cold air would be highly prejudicial, to keep up a system

of ventilation free enough to effectually dilute the poisonous emanations of even a single typhus patient; and, as a matter of fact, the introduction of a single typhus patient into a ward which was quite sufficiently ventilated for general purposes has frequently caused the disease to spread from bed to bed with most lamentable results. A fever ward should, therefore, be a special affair, with an extra amount of ventilation. Where it is possible, the fever wards should be placed in a separate block of buildings, and, where this is not the case, at least the most jealous care should be exercised to prevent communication between the attendants of these wards and those of the wards which contain miscellaneous patients. With these precautions we believe that typhus may be absolutely shut within the walls of the apartments devoted to its treatment.

Typhus is a disease especially of the winter season. It commences to increase rapidly at the cessation of the harvest operations, when crowds of ill-fed Irish and others swarm into the cities: sometimes actually bringing the infection with them. It is aggravated by any cause which throws numbers of persons out of work, since this implies both defective nutrition and increased overcrowding. It very commonly breaks out in the "tramp-wards," or places for the "casual" poor, which a late Act of Parliament obliges the boards of guardians to provide in the workhouses; and the scandalous inattention which the authorities too frequently pay to ventilation and cleanliness in these wards is often the direct cause of the disease. We may mention one instance of this carelessness of management which speaks volumes. In the interesting and clever narration of the

experiences of an amateur "casual" in the Lambeth Workhouse, lately given in the *Pall Mall Gazette*, there was one incident which excited disgust in all who read it, but which might also justly cause indignation and alarm. The "mutton-broth"-like appearance of the water in which the writer was obliged to bathe was, of course, due to the fact that one or several dirty people had already been washed in it. Our own experience of workhouse tramp-wards enables us to state that it is quite a common practice to bathe several persons in the same water. It is needless to say that the propagation of infectious disease of all kinds is favoured in the highest degree by such a custom, and the mere fact that it has only recently attracted attention is conclusive evidence of the thorough incapacity of the guardians to whose hands the management of work-

houses is committed. But, in truth, the whole arrangements of the casual wards, at any rate in London workhouses, betrays the same stupid ignorance; in no respect is this more clearly shown than by the excessive overcrowding which is allowed in these apartments, the sleepers usually lying quite close to each other, so that their breath and the exhalations from their skins must mix, and become concentrated in the most dangerous manner, particularly as there is seldom anything like an efficient set of windows or ventilators. Clearly, the department of casual relief ought to be administered in separate buildings, with *extra allowance of space:* for the dangerously ill-fed and sometimes actually fever-stricken class of casual poor cannot, without great danger, be crammed into wards which afford only 200, 300, or 400 cubic feet of space to each sleeper. The most scrupulous cleanli-

ness (including washing of the entire body) ought to be enforced on all who are not too ill; and all the clothes ought to be boiled or baked at a temperature of 212°, in order to disinfect them.

One of the greatest causes of the spread and continuance of typhus in cities is the want of *fever-houses*, which should be built in each parish; were these established, and were the parish medical officers empowered by law to order the removal to them of all cases of typhus occurring in rooms under a certain specified size, an enormous diminution of the disease would take place. Further, the vestries might be empowered, and then compelled (for they will never do it properly of their own accord), to see that a proper and copious water supply is laid on to every house by "constant service," or else stored in proper tanks, which should be frequently inspected,

to ensure their cleanliness. And on the removal of a fever-stricken family from a room, a thorough cleaning and ventilation for three or four weeks ought to be compelled before new lodgers are admitted. Till this is done the prevalence of typhus will continue and increase: and in connection with this probability there is one really appalling consideration. Many of the best modern observers strongly believe that the Oriental plague, which formerly committed such ghastly ravages in England, was only typhus fever, aggravated by the abominable sanitary arrangements which were characteristic of the age. But if we are to go on crowding our populations more and more into the towns, and neglecting their lodgment and their means of cleanliness, as we have been doing lately, there seems no reason whatever why plague should not visit us again!

There is another important source of the propagation of typhus fever, to which public attention has very properly been drawn,—we refer to the conveyance of patients to the hospitals in ordinary cabs, which are immediately afterwards employed by the public. It is quite unnecessary to say a word to prove the immense danger of the spread of contagion in consequence of such a proceeding. Doubtless these infected street-cabs are the chief if not the sole causes of those occasional cases of typhus among persons in the better ranks of life, who have never been brought into any direct personal communication with persons suffering from the disease, and the sanitary condition of whose dwellings is perfectly good. Of course there should be vehicles in each district, specially constructed for the removal of fever patients. We are glad to notice that a recently formed

association proposes to supply this want; but, in our opinion, the undertaking should be carried out by Government, or by the parish authorities, and severe penalties should be imposed on anyone venturing to remove a patient suffering from contagious fever in an ordinary public vehicle.

The early symptoms of typhus fever may be described as follows:—A person who has been exposed to direct contact, or very close companionship, with a typhus patient, or has been living for some time under circumstances of destitution in an overcrowded dwelling, or has slept in an apartment recently inhabited by a typhus patient, experiences (either suddenly, or after a few days of preliminary uneasiness, loss of appetite, and sleeplessness) a sense of chilliness or actual shivering, accompanied by a feeling of very great prostration. The chills are succeeded by heat; and chills and heat

recur at irregular intervals for two or three days: but these feelings are only "subjective." If the thermometer be applied to the arm-pit it will be found to mark a temperature as high as from 102° to 104° Fahrenheit, even on the first, second, or third day; the temperature is always highest at night, and sinks to a degree or even two degrees lower by the middle of the day, which represents the time of its *minimum*. On the evening of the *fourth day*, most commonly, though there is much variation in this respect, a great rise in the temperature takes place,—it may even go up to 108°, or higher; and this symptom immediately precedes or accompanies the appearance of the characteristic eruption. This eruption is variable in character, within certain limits; but, in the great majority of instances, it resembles that of *measles;* it consists of irregularly shaped spots or

blotches, which are most thickly strewn upon the trunk of the body, and generally have the tint of *stains made with mulberry juice;* they disappear on pressure with the finger, and reappear when the pressure is removed. The general sense of great depression which marks even the early stages of typhus is usually accompanied by great giddiness, noises in the ears, trembling of the limbs, and, in bad cases, a curious kind of insensibility, which is medically termed "coma vigil," in which the patient lies with his eyes wide open, with no approach to true sleep, but perfectly indifferent to all that goes on around him. The intellect is confused, and the memory impaired, almost from the first, and very commonly delirium comes on, and steadily increases. The countenance of a typhus patient is one of the most characteristic features of his disease; it presents a curious

earthy tint, which is quite different from mere paleness on the one hand, or red flushing on the other; and almost more characteristic of the complaint is the *attitude* which the sufferer assumes—lying on his back, and slipping feebly down into the bottom of the bed.

In concluding our remarks on typhus fever it is necessary once more to insist upon its great contagiousness to those who are engaged in *close personal attendance* on the patient. For this reason the nurses, and the *resident* medical officers of hospitals where typhus cases are treated, are especially liable to take the disease, and a practical conclusion of the highest importance results from this fact. Where it is possible, no nurse should be allowed to wait on a typhus patient who has not already had the disease, for it very seldom attacks the same person twice. Where this cannot be

managed, at any rate the nurse should be a young and healthy person, for such individuals commonly have the disorder in a mild or at least not a fatal form; whereas the mortality is very high among those who contract the disorder at an advanced period of life. And in all cases great care should be taken not to approach typhus patients *when one is in a state of great fatigue or of fasting,* for under these depressing circumstances the organism is especially susceptible of the morbid influence; and we know of many cases where the systematic avoidance of this kind of imprudence has enabled nurses and resident medical officers of fever hospitals, who were constantly exposed to the contagion of typhus, to resist its attacks altogether.

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CHAPTER III.

EPIDEMIC DISEASES

DEPENDENT ON INSANITARY CONDITIONS, INDEPENDENT OF DESTITUTION, TYPHOID FEVER, CHOLERA, EPIDEMIC DIARRHŒA.

If typh*us* be the disease, *par excellence*, of crowded, intensely competitive cities, typh*oid* fever, which was long confounded with it, is now-a-days the special epidemic of the slumbrous, conservative rural districts. This fever is the type of our second group of epidemic diseases,—those, namely, which are scarcely at all contagious, in the common sense, and which, as far as our knowledge goes, appear to derive their

origin, and certainly receive their extension, from insanitary conditions, wholly independent of destitution.

The investigation of the causes of typhoid is a more complicated question than that of the sources of typhus fever. Under the head of predisposing causes, in the first place the season of the year is very important, the disease always appearing most widely in the autumn, and subsiding to its lowest level in the spring and early summer. Secondly, the influence of temperature and moisture is very strong: it has been noted that a long continuance of hot, dry summer weather greatly predisposes to the occurrence of the disease; and conversely, a cold and wet summer and autumn hinder its development. And, thirdly, typhoid fever is distinguished by a characteristic which widely separates its causation from that of typhus—namely, that it shows a marked

preference for young subjects: 52·08 per cent. of the cases admitted to the London Fever Hospital during a period of ten years occurred in persons between the ages of fifteen and twenty-five, and only 27·76 per cent. in subjects above the latter age. Whereas typhus is, for the most part, a disease of adult age, 53·58 per cent. of the cases occurring at ages above twenty-five years.

Of exciting causes two are recognised as far outweighing in importance all the rest. The first is the direct introduction of decomposing organic matters (and possibly of organic germs developed from this source) into the alimentary canal by the agency of impure drinking-water; and, secondly, the inhalation of the gases formed in the decomposition of organic matters, and possibly specific germs along with these. Of the former mode of origin it is easy to find

countless examples in the medical history of our country towns, especially during the period previous to the adoption of deep drainage, and more recently in localities where enlightened modern views have not yet availed to force this reform on the inhabitants. The following are the typical conditions in which typhoid fever arises from impurities in drinking-water (we write with a well-remembered instance in our mind). A country town without deep drainage disposes of its sewage in cesspools; and the limited space in which the houses stand renders it inevitable that the drinking-wells should be within a very short distance of the cesspools. From the latter a continual oozing of decomposing organic matters takes place, and more or less of these finds its way into the wells. For years, possibly, no particular harm may result from this; but at length there

comes a long dry summer, which reduces the water to a low ebb, and concentrates its impurities, besides favouring decomposition; in such circumstances typhoid fever breaks out among the persons who drink the water.

Such is the story which scores of country towns have repeated in their own experience. But there is another mode of origin for the disease of which we possess examples of apparently equal accuracy. A hot, dry season favours decomposition, as we have already said: under these circumstances sewage gases ascend through the imperfect traps of the drains into the interior of the houses; and of this also an outbreak of typhoid is a frequent consequence.

This is the explanation of the genesis of typhoid fever which is given by the best authority, probably, on the etiology of the disease. The doctrine, which received the

name of the Pythogenic theory from its author (Dr. Murchison), has met with able and energetic opponents, foremost among whom must be reckoned Dr. Budd, of Bristol, who has persistently, and with great ability, opposed all suggestions of the possibility, even, of the origin *de novo* of any epidemic disease. But even this authority allows so much as that the excretions of *typhoid fever patients*, by contaminating the soil and the drinking-water, may and do cause the indefinite reproduction of the 'germs' which he supposes necessary to the propagation of the disease. In short, all observers arrive at the conclusion that it would be possible, by rendering our drinking-water absolutely pure, and by disinfecting our sewage at the earliest moment, almost or entirely to suppress typhoid fever. This is not mere theory; it has been verified in the case of Salisbury,

a town which was formerly afflicted to a large extent with the disease, but has been rendered healthy by the simple adoption of a proper drainage system. And although these facts in the history of the diseases are most readily and forcibly illustrated from the experience of rural districts where the main-drainage system has never penetrated; they may also be verified by an appeal to the circumstances under which typhoid fever still originates in London. The cases of the disease which annually (particularly in the autumn season) come into the metropolitan hospitals are furnished, in the immense majority of instances, from courts and alleys, where the carelessness of the inhabitants, or the neglect of landlords, makes the water-closets a special nuisance instead of a benefit; or where the mischievous practice of storing drinking-water in decaying wooden tubs, which are rarely

cleaned out, causes that necessary of life to be tainted with decomposing organic matter. Occasionally a case or two, or a series of cases, make their appearance in a private house of the better class; in such instances it will usually be found that the drains are in bad condition, or the drinking-water unusually foul. Other sources of fetid emanations are occasionally found: thus we have known a whole family to be made seriously ill, and more than one of its members to suffer from unmistakable typhoid fever, owing to the decomposition of the dead body of a single rat behind a wainscot or beneath a floor. In short, the cases are so rare in which the presence of putrid organic matter has not been a prominent circumstance, that it seems reasonable to suppose that this source of mischief was simply overlooked in these instances.

Upon the subject of contagion, with regard to which medical opinions were much divided in the early days of distinction between typhus and typhoid fever, there is now little doubt in the minds of the great majority of competent observers. Typhoid fever is not contagious in the same sense as typhus is. Our own experience enables us to speak with confidence on this point, for we have been able to watch very closely the course of events both previously to, and during, the present epidemic of typhus which has now infected London continuously for the last five years. Typhoid, being a disease associated with the general insanitary conditions which have always prevailed to a greater or less extent, may be said to have been a constant resident in London for any number of years; but typhus has only become permanently located there since the great influxes of destitute persons which have

taken place of late years; formerly it was only an occasional visitor. In strict correspondence with this fact was the rarity with which nurses in London hospitals contracted fever from patients in the wards previously to the commencement of the present typhus epidemic, contrasted with the melancholy frequency of such events during the last four or five years. It is true that the attendants on typhoid patients do occasionally contract that disease, but such occurrences appear to depend upon accidental want of care as to exposing themselves to the odours of typhoid sewage matters. In country hospitals, where typhoid fever constantly presents itself, and typhus hardly ever appears, it is very rare for the medical officers or nurses to contract fever; in short, all the evidence tends strongly to the conclusion that there is not, as in the case of typhus, any emanation, from

the skin and lungs, of an active contagious poison.

Typhoid fever, in respect of its early symptoms, is one of the most insidious and deceptive diseases which exist. A well marked case is usually ushered in by shivering, followed by febrile excitement; but very often it happens that the only noticeable symptoms during the first four or five days, or even longer, is the occurrence of abdominal pain and diarrhœa, the evacuations presenting a peculiar colour like that of *yellow ochre*, or rather *pea-soup*. There is great variation in the date of the appearance of the characteristic eruption; most commonly it is first seen on the sixth, seventh, or eighth day of the illness, but it may first appear several days later than this. When once fairly observed (especially if it has been preceded or accompanied by diarrhœa and abdominal pain and tenderness) the erup-

tion is highly distinctive; it consists of small circular rose-coloured spots, which are almost confined to the trunk, and are generally most easily detected in the abdomen or the chest; they vanish on pressure and return on its removal, and they present one remarkable character, viz., that they appear in *successive crops* (a very few at a time) *on successive days*. They are not much bigger than flea-bites, from which they may be distinguished by their disappearing completely on pressure; flea-bites, on the contrary, when pressed firmly with the finger, only diminish in size, but a central puncture remains visible.

It is obvious, from the above description, that a patient may be ill for eight or ten days with obscure symptoms, which would by no means indicate to an ordinary unprofessional observer that so serious a disease as typhoid fever had attacked him. Under these cir-

cumstances it is of the highest importance to obtain a simple means of diagnosis, proviously to the occurrence of the distinctive eruption, which may put friends on their guard. Such an indication is fortunately now obtainable by the use of the thermometer. Taking the average of cases (Wunderlich and Traube) the ranges of temperature are as follow :—On the evening of the first day the temperature will rise to 100½° Fahrenheit, and by the following morning will have fallen to 99½°; on the evening of the second day it will be 101½°, and on the following morning will have sunk to 100½°; on the evening of the third day it will be 102½°, and on the next morning 101½°; on the evening of the fourth day 104°, and on the following morning 103½°; on the evening of the fifth day 104¼°, and on the next morning 103°; on the evening of the sixth day 104°,

and on the next morning 102½°; on the evening of the seventh day 103½°, and next morning 102°; on the evening of the eighth day 104°, and on the morning following 102¼°; on the evening of the ninth day 104°, and next morning 103°; on the evening of the tenth day 104½°, and the morning after 103°; &c. &c. The above indications are enough to substantiate *with certainty* the existence of typhoid fever, when joined with diarrhœa, or even simple abdominal pain and tenderness. The figures of the successive temperatures may not follow exactly the standard we have given; but they will always conform, with greater or less exactness, to this *order of succession;* and, in particular, the remarkable changes which regularly occur *between evening and morning* are highly characteristic of typhoid fever. The observation of temperature supplies us with a most valuable means

of distinction between typhoid fever and typhus, in those early stages when as yet no eruption is visible. And still more valuable is the use of the thermometer in cases, which are by no means very unfrequent, in which there is an absence of severe external symptoms of fever, and no very remarkable prostration of strength in the early stages. Not long since, a patient was admitted to the London Fever Hospital, who died three days afterwards. He had suffered, about a fortnight before, from obscure febrile symptoms, which had been made light of, and he had returned to his occupation as a labourer. All this time the patient had really been suffering from typhoid fever; and the fatal result which ensued arose from a peculiarity of the disease which must be explained. Typhoid fever is accompanied by a characteristic ulceration of the mucous membrane of the small

intestines. Under ordinary circumstances this affection is only developed to a comparatively slight extent, and the ulcers readily heal again. But it occasionally happens, and is very likely to happen when proper precautions as to rest, &c., have been neglected, that the ulceration assumes a severe type, and the ulcers eat through all the coats of the bowel, allowing its contents to escape into the general cavity of the abdomen; this accident excites intense inflammation, which almost invariably proves quickly fatal. Had the thermometer been employed in the early stages of the disease, in the above-related case, the serious nature of the affection would have been detected, and the unfortunate results very probably avoided by the use of suitable precautions.

The insidious nature of typhoid fever, and the difficulty which not unfrequently occurs in

detecting its existence, makes it important that the general public should know the principal synonyms under which the affection has been spoken of, and which have often disguised its real nature. In order to appreciate these our readers must be told something of the history of the gradual identification of the disease, which has only become complete during the last thirty years. The name "typhoid fever," in its modern limited acceptation, dates only from that period. The phrase "typhoid" was formerly applied merely in a general and vague manner, to indicate a certain depressed condition of the bodily powers, which may be observed in any acute disease, just as we speak, even at the present day, of a "typhoid" pneumonia (inflammation of the lungs), signifying thereby a form of pneumonia attended with unusual depression. Typhus and typhoid fever were confounded together under the

name of "continued fever," a term derived from the greater duration of these diseases than that of measles, scarlatina, small-pox, and other eruptive fevers, in which the specific symptoms last only a few days. In this state of medical knowledge it cannot be doubted that a vast number of cases of typhoid fever—those, namely, in which the febrile symptoms were but little marked, escaped recognition under the vague names of "low fever," "fever on the spirits," "gastric fever," "infantile remittent fever," and various other uncertain denominations; this was particularly the case with regard to the instances in which the patients were young children; and this kind of error is still unfortunately too common. It is only in quite recent times that the main features of typhoid fever have been so grouped together as to render the identification of the disease accurate; these are, the delay

of the appearance of the eruption till a week, on the average, from the commencement of the febrile symptoms, the peculiar ranges of temperature already alluded to, the duration of the febrile symptoms for about three weeks (instead of about two weeks, as in typhus), the occurrence of inflammation and ulceration of the bowels, and a specific diarrhœa, the manner in which the rash is developed, in successive crops of spots, and the remarkable absence of severe prostration (as compared with typhus) in the early stages.

It would be improper to conclude our notice of the symptoms of typhoid fever without some reference to a feature of the disease which is of great consequence to those concerned in the management of patients during convalescence. Non-medical people are apt to greatly underrate the serious disturbance of the system which

is caused by an attack of typhoid, and the slow way in which convalescence is established. In the first place, the ulcerative affection of the intestines is frequently a source of danger, long after the febrile symptoms have apparently come to an end, and unless great care be taken to enforce perfect rest, and the avoidance of irritation of the intestines by unsuitable food, &c., it may take a dangerous and even fatal course. Secondly, there is a marked tendency to the occurrence of inflammatory diseases of the lungs, as a sequel to the fever. Thirdly, in persons predisposed to consumption, this malady is not unfrequently evoked by typhoid into an activity which it might otherwise never have assumed. Fourthly, a peculiar condition of the brain often remains for some time after the fever, in which there is a tendency to a semi-delirium or even to fatuousness, and the mental equili-

brium is in considerable danger of permanent impairment. These, and various other unfortunate sequels of the disease are so readily produced, that the best authorities have arrived at an opinion which is succinctly expressed by Dr. Aitken :—"No man can be considered as fit for work, or for general military service, for three or four months after an attack of severe typhoid fever."

We have spoken with much, and we believe well-grounded, confidence of the causation, or at least the principal modes of propagation, of typhoid fever. It is hardly necessary to say that of CHOLERA, which we have included in the same group of epidemic diseases, it is impossible to speak with any such approach to certainty. No doubt the disease is still an *opprobrium medicinæ*. Yet something seems to have been really learned, not merely guessed,

about this mysterious pestilence, in recent years, and fortunately our modern knowledge is of that useful kind which suggests new and promising researches.

The problems of causation which present themselves for solution in the case of genuine cholera are doubtless highly complex. Yet, be it said at once, they are decidedly less intricate than those which concern the origin of several epidemics which are far more frequent visitors of European countries, and which cause a far larger aggregate of mortality. Such facts ought to shame us from our habits of panic, and inspire us with a hopeful interest in the investigation of cholera.

The first question which comes up for investigation is that of the place of origin of the disease. Many circumstances undoubtedly point to the East, and especially India, as the original focus of cholera; and

it was the fashion, not very long since, to speak of the delta of the Ganges as the first home of the pestilence. There can be no doubt that the mouths of slowly running rivers, where large accumulations of decaying organic matter swelter beneath a tropical sun, offer many of the recognised conditions for the outbreak of epidemic diseases. But an impartial study of the records of ancient and mediæval medicine makes it doubtful whether cholera has not periodically prevailed in Europe from the earliest times: and the most that a cautious reasoner would now affirm is, that only Asiatic countries at present seem to possess the conditions for the development of cholera in such force as may suffice to send the epidemic wave rolling across the world. The question of the possible origin of cholera *de novo* must be left open; at the same time it is proper to mention that one of the

ablest of Indian observers—Dr. Barnes—gives very strong testimony to the occurrence of an outbreak, under his own eyes, in Jessore (Bengal), the spontaneous generation of which, from the exhalations arising from the decomposition of animal and vegetable matter, and the use of drinking-water in which this process was continually going on, seemed incontestable.

With regard to the effect of atmospheric influences there has always been a great conflict of opinions; but this subject is probably summed up with justice in the able treatise of Dr. Goodeve. A high temperature,* combined with moisture, especially when the air is stagnant or moving

* It would perhaps be more correct to say a *tropical* temperature. Pettenkofer, a very high authority, was so impressed by his own observations of the epidemic in Munich, in 1854, that he was led to deny the influence of temperature *in toto*.

but slowly, appears to increase the intensity of the disease; but no such combination has ever been proved to have determined the occurrence of an outbreak. And conversely, though cholera has frequently been checked by winter cold, it does not seem in any case to have been destroyed by this agency. "Neither climate, nor season, nor earth, nor ocean seem to have arrested its course, or to have altered its features. It was equally destructive at St. Petersburg and Moscow as it was in India; as fierce and irresistible amongst the snows of Russia as in the sunburnt regions of India; as destructive in the vapoury districts of Burmah as in the parched provinces of Hindostan." (Goodeve.) Again, impurity of the atmosphere has been frequently observed to promote the severity of cholera, but, on the other hand, it is found that in many epidemics some very foul and filthy

places escape altogether. The most that can be said is that "the places in which the air is most vitiated from drains, decaying animal matter, and vegetable refuse, or overcrowding and concentration of human emanations, are those in which cholera has generally been most fatal and most widely spread." (Goodeve.) But these facts, and also the circumstance that the disease affects places whose level is low, and especially the banks of rivers, are susceptible of at least a possible explanation of a different kind.

It is, in fact, when we turn to the investigation of quite another kind of local circumstances, that we get, not a full illumination, but some scattered rays of light upon the causes of the spread, at least, of cholera. The possibility of the communication of the disease by the contamination of drinking-water with organic impurities, was long ago noted by various

observers; but it was reserved for the late Dr. Snow to furnish by far the most important evidence in this direction. The year 1854 was made memorable in the annals of medical science by the remarkable outbreak of cholera in the parish of St. James, Westminster. The disease had already announced its presence by the occurrence of a few cases, during the later months of 1853; but the number of attacks declined, in the two first quarters of 1854, to a very low ebb: at the end of June, however, they began to increase, till, in the last week of September, the cholera-mortality reached 2050. In the parish of St. James the first fatal case for the year 1854 happened at the end of July; but there was only a dropping fire, as it were, which kept within quite moderate limits, up to the last days of August, when suddenly the disease made an enormous

explosion in the district. In the most crowded part of this densely crowded parish there occurred, on the 31st of August, no less than 31 fatal cases, all within an extremely narrow area; on the following day there were 131 fatal cases in the same area; on the 2nd of September, 125; on the 3rd, 58; on the 4th, 52; on the 5th, 26; on the 6th, 28; on the 7th, 22; on the 8th, 14 fatal attacks, all in the same space, which might be marked off by a circle whose centre should be at the junction of Broad-street and Cambridge-street (Soho), and whose radius would be of the length of 210 yards. From the last of these dates the disease rapidly diminished to a comparatively insignificant level, and may be said to have ceased by the end of October. Such a phenomenon as this was unusual in our English experience of cholera; and the very singularity of the outbreak inspired

Dr. Snow with the hope that fresh light would be thrown by it on the whole question of cholera-propagation. Fixing his attention steadily on the local peculiarities of the district, Dr. Snow quickly perceived that one remarkable circumstance was common to the history of the large majority of attacks of the disease,—viz., that the sufferers had been in the habit of drinking the water of a well in Broad-street, which had a great reputation for sweetness and freshness. Analysis of this water soon showed that it was highly charged with organic impurities; and on the 8th of September, the vestry, on the urgent persuasion of Dr. Snow, removed the handle of the pump, and so prevented the further use of the well. On subsequent examination it was discovered that the sewage from a neighbouring house-drain had leaked into the well, and it was, moreover, shown that

the discharges of a patient residing in the house in question, and suffering from severe diarrhœa, if not from actual cholera, must have mingled with the sewage immediately before the date of the great epidemic outbreak.

The history of this epidemic, taken in connection with analogous but less striking facts which had been before observed, afforded strong suggestions, if not proof, of the important part which impure drinking-water might play in the propagation of cholera, and the matter was by no means allowed to rest there. An examination of the circumstances of cholera-development among the inmates of the houses supplied with water by the Lambeth Water Company and Southwark and Vauxhall Company respectively, displayed the remarkable fact that the ratio of mortality from cholera was three-and-a-half times as great in the former

instance as in the latter; and an analysis of the waters of the two companies showed a corresponding difference in freedom from organic impurities. The case was rendered the more striking by the fact that the two companies to a large extent served the same general district, so that in many instances the impure water supply and the high mortality were noticed on one side of a street, in contrast with the purer water and the lessened mortality in the houses actually opposite.

The inferences which may be drawn from the great mass of facts which has now been arrayed by various observers, in favour of the influence of impure drinking-water in the propagation of cholera, must not be over-rated. We can afford to pass, without much comment, the adverse conclusion of the Reporter to the Cholera Committee of the Royal College of Physicians in 1854,

since the writer was not in possession of the remarkable evidence arising out of the investigation, by Dr. Snow and others, of the circumstances of the outbreak in St. James', Westminster. The adverse testimony of Professor Pettenkofer, of Munich, is of far greater importance, both from the deserved weight attaching to the opinions of an extraordinarily able observer, who had enjoyed extensive opportunities of investigating the subject, and also because the Professor advances observations and a theory of his own which bear forcibly on the part which excremental impurities may play in the spread of cholera. In the first place, Pettenkofer's observations appear to prove decidedly that the drinking-water had no considerable share in the propagation of cholera in the epidemic at Munich. But they further demonstrate, very clearly, that the situation of houses on a porous soil of any

kind ensured a greatly increased rapidity and energy of diffusion of the disease ; while rocky foundations afforded a very remarkable protection from the same. Pettenkofer was convinced, by ample evidence, that the penetration of the soil by the discharges of cholera patients was the first essential link in the chain of propagation, and the coincidence of this part of his theory with Snow's affords a strong support to it. The further stage, however, was considered by the Bavarian professor to consist, not in the defilement of the drinking-water, but in the formation of a miasmatic *vapour* from the decomposing matters, which vapour conveyed the poison, by inhalation, to the lungs of the inhabitants of the houses.

There appears to us to be no reason for rejecting either theory ; and as far as regards the propagation of cholera in a place which has once become infected, we feel that the

united testimony of the two observers gives enormous weight to the belief that the leakage of sewage matters through a spongy soil is the point of departure in the process; while, quite possibly, both drinking-water and sewage-gas may become the carriers of the poison to the human body. It is obvious, too, that a circumstance to which great force was given, in the report of the Registrar-General on the cholera mortality in 1848-9—the effect, namely, of comparative *elevation of a site* in decreasing the ratio of its liability—may be interpreted as an indirect confirmation of the disastrous effects of sewage contamination, seeing that the lowest sites are necessarily the worst drained. Still more susceptible of such an interpretation is the fact, which was clearly demonstrated by the Registrar-General, that the spread and fatality of cholera are directly increased by augmented density of popula-

tion. In short, there appears to be sufficient ground for a very strong belief that the prevention of sewage-leaking, which is accomplished wherever a proper deep drainage is carried out, strikes a fatal blow at the most powerful medium of cholera-diffusion.

Of contagiousness, as that word is understood in the case of such diseases as typhus, or small-pox, or scarlet fever, cholera seems to have little or nothing; the concurrence on this point of Snow, Pettenkofer, Goodeve, and the great majority of the Indian practitioners, is sufficient to settle that question to our minds, even though a considerable number of the adversaries still hold to their opinion. Moreover, certain disagreeable explanations by Snow, of the manner in which infection may be caused by swallowed impurities derived in other ways than through drinking-water, appear to amply satisfy the requirements of those cases which cannot be

explained by the water-theory or by the miasm-theory.

The mode of *transit* of cholera, from one place to another, is a very interesting subject. There can be no doubt that, in the majority of cases, the march of the disease follows closely the lines of most frequent human communication: thus it always appears first, in any country, at the seaport towns, and these places form the first centres of infection. It may be tracked, by this sort of route, all the way from India, in each of the three great epidemics (of 1831, 1848-9, and 1854) which have visited this country. On the other hand, there are cases in which the spread of cholera across the sea, or across great districts of land, seems to have happened without human communication: the instance of the island of St. Kilda, Western Scotland, is remarkable in this way, for there seems

to have been a complete absence of any possibility of human intercourse with the main land. Indeed, so many analogous cases have been recorded, that Dr. Goodeve comes to the conclusion, that "it is indisputable that cholera originates in places without its being possible to trace any previous communication with infected persons." These facts are of course explicable on different hypotheses. Either the outbreaks which occur in this remarkable way may be instances of the generation of cholera *de novo*, from insanitary conditions prevalent on the spot, or we may suppose the poison to have been carried by currents of wind. In favour of the former theory, there are certain facts of much interest: thus, at Coventry, in 1838, an extraordinary outbreak of true Asiatic cholera occurred in the House of Industry, in the middle of winter, at a time when cholera was not

prevailing in the country; fifty-five of the inmates perished very quickly. On the other hand, the theory that cholera is disseminated by an air-borne poison, or that the virus is, at least, occasionally diffused in this way, finds many respectable supporters; and there are some remarkable facts which seem to confirm this idea. Thus, Dr. Parkes relates that "at Madras the disease was heard of at a station ninety miles off; a few days afterwards it appeared in Madras itself. And a wind blew directly from the station in which the disease had shortly before been prevalent." There is some reason to think that cholera spread from Armagh to Belfast, in the year 1848, by the agency of a strong wind, which blew directly from the former to the latter place, for nearly a whole day. And at Sunderland, in the same year, the first case on shore occurred in a house which was

situated directly to leeward of some infected ships, while a strong east wind was blowing over the latter. There are several similar cases on record; but it must be allowed, on the whole, that they are too few in number, not to be open to much suspicion of fallacy in observation.

Supposing the poison to be air-borne, or to be capable of this mode of transit, there are still two further suppositions which are open to us. We may suppose the virus to consist of a simple material substance; and in that case there is more probability of its being really a kind of microscopic fungus than anything else. Or we may select the theory to which Dr. Goodeve seems to incline: namely, that the infection may be air-borne, but that it needs, for its development, to meet with a peculiar local element with which it may combine. On the whole, the practical conclusion which

seems most consonant with all the facts, as to the propagation of cholera, is that, in the great majority of instances, the communication of the disease takes place by human means; and by the infection of a locality, in the manner described by Snow, or else in that supposed by Pettenkofer. Accepting either, or both, of these modes of multiplication of the poison, we leave open the possibility that the poison is really of the nature of a fungus, or some other low cellular organism; and this latter hypothesis would undoubtedly possess the convenience of agreeing well with the possibility of occasional transmission by winds.

The premonitory symptoms of cholera are few and vague in character. A certain number of patients suffer from giddiness, noises in the ears, &c., for some hours before the outbreak of distinctive symptoms; but the majority are not conscious of anything

wrong till diarrhœa or some other special symptom suddenly occurs. The diarrhœa may commence as ordinary relaxation of the bowels, only more severe than the common forms of that affection; but very soon, in the great majority of cases, the discharges become extremely frequent, and very colourless and watery, and they present an appearance of being filled with white flakes, which give them a look resembling that of *rice-water*. The central and essential feature of all cases of true cholera is the occurrence of a peculiar state of *collapse*, which comes on after a few hours, or even in a shorter time, from the first morbid symptoms; this collapse is indicated by a deadly coldness, and a livid paleness of the surface of the body, total loss of muscular strength, coldness of the breath, voice reduced to a whisper, and an entire suppression of the urinary secretion; usually, also, there are

severe cramp-like pains in the abdomen and limbs. The intellect retains a remarkable clearness even to the last; there is a complete calmness of mind, and an entire absence of emotion at the prospect of death; and patients will often dictate, without the least appearance of agitation, minute and important directions respecting the disposal of their property, &c. It is a noteworthy circumstance that, in a good many of the severest and most rapidly fatal cases, there has been, from first to last, a complete absence of diarrhœa; this fact has been held by many observers, and rightly so in our opinion, to prove that the intestinal affection is not the primary or essential feature of the disease. This is a matter of the greatest consequence, not merely as regards the medical treatment of cholera, but because the opposite opinion naturally leads to a too great reliance by the public on the efficacy

of medicines calculated to check diarrhœa. There has been, and there still is, a great tendency to imagine that cholera is ordinarily the sequel of neglected common relaxation of the bowels, and that a timely suppression of the latter symptom would save the patient; but we are bound to say that there seems to be but little evidence which is of any worth in favour of this view. As positive evidence in the contrary direction we may mention the testimony lately given to us by a medical friend who had very ample opportunities, as a parish surgeon, of watching the dreadful outbreak of cholera in one of the most crowded London districts, during the year 1854, is most unequivocally opposed to this idea. This gentleman asserts that he witnessed, over and over again, cases of common autumnal diarrhœa treated, by the ordinary remedies for that complaint, with

success; but cholera nevertheless supervened shortly afterwards, and proved fatal. A very large number of cases of cholera also occurred quite suddenly without any preliminary stage of common diarrhœa. The inference suggested by these facts is by no means that symptoms of what seems ordinary diarrhœa, occurring at a time when cholera is prevalent, should be neglected, or regarded as trivial; but simply that medical advice should be sought at the very earliest period, and that no confidence should be reposed in home remedies, administered with a view to checking an attack of diarrhœa.

We pass, now, to the consideration of another disease, closely bound up with cholera, and standing in a most important relation to its development, which must be briefly sketched, — we refer to epidemic diarrhœa, or "English cholera."

Epidemic diarrhœa is the constant product, in this country, of autumnal seasons which succeed to a long continuance of hot, dry summer weather. It is now well established that this affection is caused by the effluvia from decomposing organic matter, or by the admixture of such impurities with drinking-water; hence its special prevalence at seasons when the temperature has occasioned a reduction in the volume of rivers, springs, &c., and at the same time hastened the putrefaction of organic matters which they may hold in solution. These facts being now well ascertained, are of the highest interest in regard to the constant relation which exists between the development of epidemic diarrhœa, and the liability to outbreaks of true Asiatic cholera: this relation is established in the clearest manner, by the records of disease and mortality for the great cholera-years.

Thus, for the two years previous to the outbreak of cholera in 1848, there had been a progressive increase in the amount of epidemic diarrhœa, and the latter affection raged with great violence, during the progress of the more serious disease, in 1848 and 1849. Similar facts were conspicuous in the history of the cholera epidemic of 1854; and during last autumn scarcely any physician would have denied that the increase of diarrhœa was by far the most serious omen in regard to the probability of an extension of the "Asiatic" malady to our shores. It is a mistake to suppose that ordinary years witness no true cases of the more formidable disease in England: on the contrary, a year never passes without the occurrence, during the diarrhœa season, of a few deaths from diarrhœal affections which assume all the characteristics of genuine cholera. In short, the connection

between epidemic cholera and epidemic diarrhœa is so close, that although we cannot suppose the one to be a mere aggravated form of the other, we may almost venture to affirm that, if once the insanitary conditions which bring about the occurrence of the latter disease were removed, the former could hardly prevail with any serious intensity.

Under the heading of epidemic diarrhœa we may properly include an affection which really belongs to the same class, though its common appellation, and some of the anatomical changes which have been observed to attend it, have led to its being confounded with a tropical epidemic disease, which is of a very different nature. We refer to the so-called "Dysentery," which is occasionally observed in the inhabitants of Great Britain, and which was formerly a very fatal disease in this country.

The true tropical dysentery is a specific and very interesting disease, having intimate though not accurately ascertained relations with the more severe intermittent and remittent fevers. Its British pseudo-representative resembles it in so far as regards the intestinal symptoms, which consist of a bloody and mucous flux from the bowel, recurring in small quantities at very short intervals, and attended with great straining and distress; and, after death, in the extremely rare fatal cases which happen in this country, there is discovered more or less of the same inflammation and ulceration of the large intestines which distinguishes the tropical complaint. But British dysentery resembles British diarrhœa in bearing every degree and variety of significance according to the circumstances under which it originates. Common diarrhœa, for instance, may be a mere symptom

of irritation in the bowels, which may arise from a score of different causes, none of which are connected with the action of a specific blood-poison; and, in the same way, dysenteric diarrhœa may be caused by numerous sources of intestinal irritation. It is only when either diarrhœa or dysentery occur under the conditions which have been described as favouring the propagation of the class of diseases which form the subject of this chapter that they assume the epidemic type in temperate climates. Two very interesting examples may be cited here of the kind of pseudo-dysentery which is capable of being generated by the bad influence of the vapours arising from decaying organic matter. The first is one which occurred during last year at a lunatic asylum: this establishment was surrounded by fields the cultivation of which formed an interesting and very

valuable occupation for many of the unfortunate inmates of the asylum. It was determined to test upon these fields the value of liquid *sewage* as a fertilising manure, and, accordingly, large quantities of the sewage matters supplied by the house were applied to this economic purpose. Unfortunately, it happened that a part of the ground so treated lay very near to the windows of the asylum, and the wind carried the gases from the decomposing organic matters into the house: the result was an outbreak of very severe and fatal dysenteric diarrhœa. It was immediately pointed out by various medical men that all this mischief might have been avoided by disinfecting the sewage matters before discharging them on the land; meantime the harm had been done. Another instance of the power of putrescent organic matters to produce a dysenteric diarrhœa is found

in the history of the Newington Workhouse. This establishment was one of the last places in London to share in the benefits of the main-drainage system, and up to a comparatively recent period a very large, open, tidal sewer, which stank offensively in hot and dry weather, ran close under its walls. The records of several years of the medical history of the workhouse, which were kindly furnished by Dr. Iliff, the medical officer of health to the vestry, show that diarrhœa and so-called dysentery had frequently occurred among the workhouse inmates, under such circumstances as left no doubt that the effluvia of the open sewer had been the active cause of mischief.

In concluding this chapter we must refer to the subject of disinfection. The diseases of which we have been treating certainly owe their propagation chiefly to sewer gases in the air, and sewage matters mixed with

food or drink; and, although a radical preventive treatment would require those measures of precaution against the admission of impurities which we have already described, nevertheless there is much to be done in mitigation of the evils which such impurities cause, by means of disinfecting agents.

We shall speak, *seriatim*, of the measures to be adopted for disinfecting: (*a*) drinking-water, (*b*) the air of rooms, (*c*) the linen and other articles of clothing which may have come in contact with infecting discharges, (*d*) the discharges themselves.

a. Drinking-water is to be disinfected by the processes of boiling and filtration. The water being first boiled, is afterwards to be filtered through charcoal; filters of this kind are easily obtainable, and the neglect of their use is unpardonable when there is the slightest reason to believe that there

is a possibility of the water being contaminated by decaying organic matter. *b*. The air of rooms cannot be purified without, in the first place, establishing the freest ventilation. But, in addition to this, it is desirable to provide a highly volatile disinfectant, which shall penetrate to every nook and corner of the apartment; and for this purpose there is nothing better than *carbolic acid*. Little wooden boxes should be placed in different parts of the room, containing the carbolic acid, their lids being fitted with a perforated zinc plate, through which the vapours may escape. *c*. Clothes, bedding, &c., which have been soiled with infecting discharges, if incapable of being washed, may be exposed in an oven, for two or three hours, to a heat of 212° Fahrenheit. Linen and other things which can be washed should be first *boiled* in water for two or three hours, and then

soaked for some time in water containing one-fiftieth part of Condy's *red* disinfecting solution. *d.* The discharges of patients should always, when this is practicable, be received in a vessel containing water strongly impregnated with Condy's red fluid. Drains and closets which smell badly should be purified by frequently throwing down them Condy's fluid, diluted with twenty or thirty parts of water. And where it becomes necessary, as a precautionary measure, to empty cesspools or privies, it is important to disinfect the sewage matters by the free use of Condy's solution, and the air by means of carbolic acid, or by burning sulphur: the disinfecting process being kept up as long as the slightest sewage-smell is perceptible.

But the defensive measure which, more than any other, is important for those who attend upon the sick, is the precaution

of never eating food with hands which have not first been washed in water impregnated with a disinfectant, such as chloride of lime, or Condy's red fluid.

CHAPTER IV.

INFECTIOUS EPIDEMIC DISEASES

WHICH ARE COMPARATIVELY INDEPENDENT OF DEFECTIVE SANITARY ARRANGEMENTS.

In speaking of the causal conditions, so far as they are known, of our two first groups of epidemic diseases, we have been travelling over ground which is comparatively firm beneath our feet. It is far otherwise when we pass to the consideration of our third class, under which we include scarlet fever, diphtheria, measles, whooping-cough, and influenza. It must be fairly owned that our faith in the possibility of an ultimate extinction of epidemic diseases by preventive measures is subjected to a

considerable strain, when we contemplate the seemingly capricious and incomprehensible ravages of these maladies. Far more justly do they deserve the name of modern plagues than does the cholera; for not only are they fearfully destructive of human life, but their mode of origin and outbreak is wrapped in what appears to be almost impenetrable mystery; and their prevention seems for the present to be nearly impossible.

This general statement needs, perhaps, some modification as far as regards scarlet fever.* The generally unhealthy influences of dirt, impure air, foul drinking-water, overcrowding, &c. (which are known to increase the virulence of *all* epidemic diseases), have in some instances been noticed to give a particularly strong impulse to the propaga-

* Or 'scarlatina.' This word has, by a common mistake, been supposed to mean a different disease from scarlet fever, but the two are identical.

tion of this fever. But in the present state of our knowledge the disease must be held to be separated by wide distinctions, both from the type which is most conspicuously represented by typhoid fever, and from that which is characteristic of relapsing fever and typhus.

We have no knowledge whatever of the origin of scarlet fever *de novo*. It contests with small-pox the evil distinction of being the most virulently contagious disease in existence. There is no need to have direct contact with the body of the infected person, or to swallow matters contaminated by his secretions—there is no necessity even to be in the same room with him, in order to contract the disease; the poison diffuses itself with the utmost rapidity through the atmosphere of a whole house, and no single inmate is safe unless he is already 'protected.' This phrase refers to a peculiarity which

scarlet fever possesses, in common with small-pox, typhus, and some other contagious diseases; namely, that it rarely attacks an individual who has suffered from it before. Partly in consequence of this, but probably also for other reasons not so clearly known, it happens that young children are greatly more susceptible of the infection than adults: something like 68 per cent. of the total mortality occurring in subjects under five years of age, and about 24 per cent. more in children between five and ten years old. There is something appalling in the malignity of infection which distinguishes scarlet fever: not only does it spread with fatal celerity through whole households, but the poison adheres with great tenacity to everything it touches, so that the walls of rooms in the infected house, and the clothes, not merely of the patient, but even sometimes of those around

him, obstinately retain a contagious power. There is considerable reason for thinking that the agency of this diffusion of the disease consists in a peeling of the outer skin which accompanies convalescence; the scales of dead epithelium are broken down into a minute dust, each particle of which is perhaps charged with the poison. It is, at least, notorious that patients are immensely more apt to give the disease to others, during the period of "desquamation," as it is called, than in the early stages: and it is certain that in bright sunlight a cloud of fine dust may be seen to arise from the body, especially at this period, if the clothes be suddenly withdrawn. Supposing this epithelial dust to be the main agent of infection, there is no need to search any further for the cause of that intense activity of propagation which characterises scarlet fever. But the singularity of the disease

is even more strikingly evident in the length of time during which infected articles of clothing, furniture, &c., may retain their noxious properties; even at the end of twelve or eighteen months such objects have been known to communicate infection!

Such facts might far better justify a panic —if panics were ever justifiable—than the threatened return of cholera to England: for scarlet fever is always at our doors, and numerous chances expose each household of young children to the possibility of a fatal invasion by it. And yet out of this evil, as from every other, there has come good: for the one measure which, far beyond all others, has been found to practically mitigate the virulence of scarlet-fever contagion is ventilation, and the remarkable influence which it exerts in this case has done much to direct attention to its importance in the treatment of other zymotic diseases. It is

obvious, from what we have already said, that in the case of scarlatina attacking a member of any household, the sick-room must for safety be ventilated in such a manner as shall ensure a copious and continuous supply of fresh air; and that all unnecessary furniture (particularly curtains, carpets, and other woollen stuffs) should be done away with; the apartment being kept warm by means of a good open fire unless the weather be very hot indeed. Far more than in the case of typhus, or any other infectious disease except small-pox, is it necessary that the clothing, bedding, &c., used by the patient, should be scrupulously disinfected by the application of a very high temperature and the use of disinfecting solutions, and that walls, ceilings, and woodwork should be freshly limewashed, and painted or papered. But no known precautions can make a house in which

scarlatina has appeared, absolutely free from infectious properties till a considerable time has elapsed.

The early symptoms of scarlet fever are usually distinctive. In the majority of cases there is a distinct period of latency between the exposure to infection and the occurrence of any signs of illness; but the length of this period may vary from one to several days, and may even occupy but a few hours. A shivering fit is usually the first symptom, and this is followed by feverish heat, which steadily increases. The skin feels pungently hot to the hand, and the thermometer marks a temperature of 105°, or sometimes much higher. Occasionally there is severe vomiting, and there is always a great sense of oppression and headache previously to the appearance of the eruption. The latter event takes place from 24 to 36 hours after the commencement of the symptoms. The erup-

tion first appears as a multitude of minute brilliant-red points scattered thickly over the skin, and giving a sense of roughness to the touch. Very soon, however, they so far run together as to give the appearance of a uniform red blush, which is commonly compared to the colour of a boiled lobster. At the same time as the eruption is appearing on the skin, changes are going on in the mucous membrane of the mouth and throat. The tongue is at first covered with a thick white fur, through which a number of red papillæ stand up; these red points are most numerous towards the tip, and give the appearance called "strawberry tongue." In a few hours later the white fur has disappeared, and the whole tongue is brilliantly red, and rough; the redness extends also to the back of the mouth, spreading over the tonsils and soft palate. A painful soreness of the throat is noticed, and actual

ulcers are found on inspection. The appearance of the skin eruption is usually signalized by great relief to the sensations of general distress and discomfort; but the temperature commonly goes on rising for a day, and sometimes two days, after the first occurrence of the skin affection.

There are cases, however, in which the very characteristic train of symptoms above described is by no means present. It may happen, for instance, that the rash never appears at all; or there may be, from first to last, no sore throat. Or, again, in cases where the infection is very intense and concentrated, it sometimes happens that the patient sinks into a state of profound nervous prostration, usually accompanied with stupor, and dies, between the first occurrence of symptoms and the period at which the eruption might have been expected to appear—fairly crushed, as it were,

with the force of the poisonous impression on the system. Or it may happen that the system has just strength to survive the eruptive crisis, but the eruption instead of being bright red-coloured, may be dusky or livid in hue, indicating failing powers of circulation. Or, finally, the throat affection may altogether outweigh all the other symptoms in importance: the throat may be so severely ulcerated from an early period as to become a source of danger to life; and this has even happened, now and then, in cases where no skin eruption has ever appeared. These important possibilities of variation plainly prove the value of a test like that of the thermometer, which in either of these anomalous conditions would still have proved the existence of febrile disturbance so severe as to call for the advice of a medical man. Another symptom which is of serious import in a case where there is

any possibility of scarlatina infection having been induced is the occurrence of dropsy; especially when this is combined with a sudden suppression or great reduction of the urinary secretion, or the appearance of a *smoky colour in the urine.* The scarlatinal poison has a great tendency to affect the kidneys; and the last-named symptoms are an indication that this very dangerous affection has actually occurred.

A word must be said as to the appearance of the throat in those cases where the throat affection is a conspicuous symptom. However severe the inflammatory and ulcerative changes in this part may be, they are usually distinguishable from those which occur in diphtheria by the non-occurrence of a "false membrane," such as we shall have to describe when we treat of the latter disease. The appearances are those of low inflammation and ulceration. Still it is by

no means always possible, even for a medical observer, to distinguish between the two diseases by a mere inspection of the throat; the general character of the symptoms, and especially the comparative absence of febrile heat (as measured by the thermometer) in the case of diphtheria, is more distinctive. But, in the case of scarlatina, the thermometer, at any rate, will give indications, even at an early stage, and before the appearance of the eruption, which ought to lead to the immediate summoning of medical assistance.

If we are in the dark about the origin of scarlet fever, we are still more in doubt as to the original causes of diphtheria. The disease has doubtless prevailed epidemically, at intervals, from the earliest times of which we possess any medical records; but the general recognition of its characters, as distinguished from those of common inflam-

matory croup and some other diseases which superficially resemble it, has only taken place within the present century. As with scarlet fever, so in the case of diphtheria, we have no knowledge of an origin *de novo;* contagion has always appeared to be the cause of the outbreaks which have occurred of late years: but the contagion is of a highly peculiar and obscure kind. The poison resembles that of scarlatina in adhering obstinately to the walls or furniture of houses; but it is essentially devoid of the power of rapid diffusibility through the air which belongs to the latter virus: and it is also clearly distinguished by its extraordinary tendency to affect a number of individuals belonging to the same family, even though their exposure to its influence may have been very slight. It is clear that original constitution is a highly predisposing cause of the disease. Less than almost any

other known epidemic disease does diphtheria appear to be influenced by the existence of sanitary defects in a house or a neighbourhood: the most that can be said of these influences is that the malady probably lurks longest in localities where they are present in a high degree. On this point the elaborate researches of Dr. Sanderson (made for the medical department of the Privy Council), and of Dr. Greenhow, seem to have exhausted the topics of inquiry, with an almost entirely negative result. Nor is there any evidence that destitution has any particular predisposing effect, although bodily fatigue, and more especially nervous exhaustion from over-excitement of intellect or emotions, appear to render both the poor and the wealthy liable to the attacks of the disease. But the one predisposing cause which outweighs all others—even that of hereditary constitution—is *age*.

Like scarlatina, it is eminently a disease of children; and it rarely occurs twice. But the adult who takes it is far more liable to suffer severely than the adult who contracts scarlatina, except, indeed, when the latter disease attacks women at the time of confinement, when it is excessively fatal.

The early symptoms of diphtheria are often obscure, and unfortunately the progress of the malady is usually so rapid that serious results may ensue from ignorance on the part of the patient's friends as to the nature of his complaint. The introductory fever is usually slight, and the symptoms which first arouse attention are the occurrence of glandular swelling about the neck (underneath the jaw), and difficulty of swallowing; together with a very marked sense of depression and great drowsiness. In about twenty-four hours, more or less, from the first occurrence of uneasiness in

the throat, the tonsils and back of the throat have become red or purple, and much swollen, and soon after this a peculiar appearance is observed, viz., the presence of a thick layer of whitish or yellowish *membranous matter* coating the affected parts at the back of the mouth. It is of great importance, however, that medical assistance should, if possible, be called before the affection has arrived at this latter stage; and it is a good rule, especially when diphtheria is known to be prevalent, that no case of sore-throat, attended with great depression and difficulty of swallowing, should be left without medical inspection. Sometimes the disease affects the windpipe, from the first, more powerfully than the throat, though, as a rule, the order of events is opposite to this. When the windpipe becomes affected there is more or less embarrassment of breathing; at the same

time the difficulty of swallowing becomes more and more pronounced. The obstruction of breathing is always a most formidable sign when it comes on rapidly under circumstances which make the existence of diphtheria probable, or even possible; for in this disease the affection of the windpipe which interferes with free respiration consists in the exudation of a membranous coating on the inner surface of the air-tube, exactly similar to what is seen on the tonsils and the back of the throat; and death very often results from the mechanical stoppage of the tube by the membranous substance: the patient becomes suffocated, in fact.

Both scarlet fever and diphtheria are formidable, not only on account of the great mortality which they cause, but from the dangerous effects which they often leave behind them in the general constitution.

The former is very liable to be followed by kidney disease and dropsy, by abscesses of the tympanum and consequent deafness, or by tubercular disease; the latter is distinguished among all epidemic diseases by a tendency to produce some peculiar forms of paralysis.

Of the causes of Measles there is little to be said which can immediately benefit the public. Our knowledge of its origin and propagation is almost limited to the facts that it is excessively contagious, though not so much so as scarlatina; that it is very fatal to children, especially in crowded towns; and that the poison is diffusible through the atmosphere, so that the only chance of mitigating its activity lies in using the freest ventilation. Like scarlatina, it presents no features, in the present day, which give us the right to assume an origin *de novo*: and insanitary conditions,

with the exception of defective ventilation, exercise only a moderate influence on its progress or fatality.

We say "with the exception of defective ventilation," and this is important, for great aggravation of the virulence of the contagion of measles may be produced by this agency. We can hardly illustrate this better than by relating an instance which came under our notice a few months since. In the workhouse of St. Martin's-in-the-Fields (an old, dingy, and unwholesome building, jammed in behind the National Gallery) the nursery, in which a number of young children are kept by night and day, is extremely ill-ventilated and overcrowded, and its atmosphere is habitually foul; at least this was the state of things at the time of our visits, in June and August, 1865. We learned that some months previously a woman accidentally came into this apartment, bearing

with her the infection of measles; the result was a most disastrous outbreak of the disease, in which nearly all the children were attacked, and eight, nearly half of those who sickened, lost their lives; the contagiousness of the disease was most virulent.

The early symptoms of measles are usually distinctive, if carefully observed; but where attention has not been called to the patient's complaints at an early stage there is sometimes considerable difficulty in deciding as to the nature of the disease, since the eruption often presents resemblances to that of scarlatina.

A typical case of measles commences, about a fortnight after exposure to infection, with chilliness or actual shivering, and with severe symptoms of cold in the head, the *sneezing* being usually violent, and the eyes being red and watery. The thermometer

applied to the arm-pit detects the fact that the temperature is rapidly rising; by about the end of the fourth day, inclusive, it stands, on the average, at 106°; it is now that the eruption makes its appearance; the temperature still goes on rising for about twenty-four hours longer, and very commonly reaches the great height of 109°, from which point it steadily and rapidly falls again. The eruption appears (according to Dr. Aitken) in three successive crops at intervals of about twenty-four hours; the first crop appears on the face, neck, and arms, the second on the trunk, the third on the lower extremities. The spots are at first small, like flea-bites, but they afterwards run together and form patches, which are often of a crescentic form; they are most thickly scattered on the face, back, and loins; their colour is generally of a deep raspberry hue; they disappear on pressure,

and return when this is removed. This is the *typical* character of the eruption. But it may, on the other hand, vary in the direction of resemblance to *scarlatina*, the spots being very numerous, small and distinct from each, and of a *bright* red colour, so that their general appearance resembles that of the *blush* of the scarlatinal eruption. And on the other hand, the spots sometimes assume the character of little pimples, which may even have a watery head; in this case great doubt may be felt whether the disease is not *small-pox*. Fortunately, there will be no need for the patient or his friends to decide any such doubtful points, for the indications of the thermometer will be such as to indicate that the case demands medical advice.

At this point we think proper to introduce a few words, of description only, with respect to Small-pox. As already stated,

we have no intention to discuss the pathology of the disease, because it has been removed, by the invention of vaccination, from the list of those diseases which cause a very large mortality, and its importance to the public is thus diminished. But so long as centres of infection are left in existence by the imperfect carrying-out of vaccination, there will be occasional outbreaks of the disease, not merely among the poor, but even among the wealthy classes; we think it necessary, therefore, to describe the premonitory symptoms, which call for the immediate adoption of precautions. After the patient has received the infection there is a period of latency or incubation, varying from ten to sixteen days, and then the symptoms commence with a shivering fit, followed by intense pain in the limbs *and especially in the back*, and in nearly every case by severe vomiting.

There is severe headache and drowsiness, and sometimes even insensibility. Febrile heat is developed, and continuously rises, till about the evening of the fourth day, when the eruption makes its appearance; at this moment the thermometer stands, on the average, at 104°. The eruption consists of pimples scattered most thickly on the face, and when the disease is natural in type, the appearance is so characteristic that it is not likely to be mistaken. But when, as now and then happens, the infection of small-pox attacks a person already partly protected by an imperfect or too-long-past vaccination, the character of the rash, and indeed the whole course of the disease may be modified in such a way as to puzzle even the most skilled physicians. In any case the appearance of the eruption is followed by a remarkable and steady fall of the temperature which continues without intermis-

sion during the next day or two, and is accompanied by a great alleviation of the oppression under which the patient laboured in the pre-eruption stage. During the first twenty-four hours from the commencement of symptoms, there would be always a doubt between small-pox and *scarlatina*, but the occurrence or non-occurrence of the scarlatina rash at about the end of that time would, in most cases, settle the matter as between these two diseases. Even then there might be a doubt, up to the moment of the eruption, between small-pox and *typhus*, were it not for the thermometer, which in the former disease gives no indication of the remarkable daily rises and falls of temperature which occur during the pre-eruption stage of typhus, and which have been already described.

Most of the remarks which we made with reference to the state of our knowledge of

the pathology of measles might be used in speaking of whooping-cough: save that the latter disease is far more commonly known to occur in isolated, so-called "sporadic," groups of cases.

Whooping-cough stands in a remarkable position among epidemic diseases. It is plainly contagious in a high degree; and its course, though very long, is divisible into three tolerably distinct stages. But the first stage (which should be that of initial *fever*) is attended, usually, with very little real elevation of the bodily temperature. We have repeatedly examined patients with the thermometer, and have never found the temperature to exceed 100°, unless the case was complicated with bronchitis or pneumonia. There is commonly, however, some little catarrh, and some slight oppression of breathing, during the first stage. The cough is from the first noisy, and

occurs in long fits, during the interval of which the patient is quiet. The commencement of the second stage is marked by the development of the characteristic "whoop:" a sound which it is impossible to describe, but which, once heard, is easily recognised again. But it is important to discover the existence of the disease in its initial stage, so that measures may be adopted for avoiding the spread of the malady to other persons. The only symptom which can be of use for this purpose is the *paroxysmal* nature of the cough, taken together with the age of the patient, and the fact that he has never suffered from whooping-cough before, (a second attack of the disease being rare,) and the prevalence of the complaint in the neighbourhood at the time. Whooping-cough is usually regarded as a trifling disease, and parents think with little alarm of the probability of its spreading from one

member of their family to the others. It is, however, of real consequence that weakly children should be spared if possible from this malady; for its influence on delicate young persons, especially those who possess an hereditary taint of consumption, is often most injurious. It is also highly important that infants who are going through teething should be spared an infliction of the disease. Dentition is always a trying process for the nervous system; it is a familiar fact that convulsions are very apt to occur during its progress. Now whooping-cough is caused by a poison which operates with especial force upon the nervous centres, and, indeed, the specific "whoop" is the consequence of a convulsive affection of the muscles of the larynx arising from nervous irritation; it is easy, therefore, to see how likely this complaint is to aggravate any existing tendency to convulsions. For the above reasons

it is highly important that all delicate children, and all young infants should be separated from infected subjects as soon as the latter can be proved to suffer from this disease. Where it is not possible to prevent the healthy living in the same house with the sick, it should be made an absolute rule that they should not sleep together, nor play together, and especially that they should not kiss each other, as the breath unquestionably conveys the poison.

Measles and whooping-cough, of whose origin we know so little, and against which we have but few preventive resources, are constantly with us, and they respectively killed 18,256 and 26,982 persons, in the thirteen years from 1852 to 1864 (inclusive), in London alone. So large a mortality could hardly fail to produce great terror, but for one circumstance, which it is sad to think should have so deadening an influence

on public feeling: we mean the fact that the immense majority of these deaths are those of young children. It is a melancholy sign of the effects of that ever-growing curse of England—the over-population of the land—when we see the untimely fate of these children attracting so little notice. It is certain, however, that the medical profession does not share this apathy: on the contrary, the very obscurity which surrounds these diseases, and some others of which we have spoken, renders them the objects of intense and eager curiosity; and we feel little doubt that something will be elicited before long which will throw light upon the matter.

Influenza is a disease which has a greater importance than might be supposed, from the small number of deaths (only 1168) which have been mentioned as occurring from it during a period of thirteen years. In truth, this malady, though it has pro-

bably occurred at intervals from the earliest times, has never appeared in this country in a wide-spread epidemic form since the year 1847, but on that occasion it attacked no less than 250,000 persons in London alone; the mortality was something appalling, but it fell chiefly on adults, and especially on the aged. Thus, while the average mortality in childhood was raised 83 per cent. by the epidemic, that of adults was raised 104 per cent., and that of aged persons 247 per cent. The causes of the epidemic influence are not known with any approach to certainty; the only theory on the subject which has any weight of facts to support it, being the hypothesis of propagation by fungoid germs: but this is at present a mere speculation. In its power of sweeping suddenly over a wide space of country, and infecting an immense number of individuals, influenza stands almost, if not quite, at the head of all the zymotic class.

No word is more commonly and mischievously perverted in its popular application than "Influenza." The term is vaguely applied to every severe cold which is attended with a good deal of depression; but, in truth, the genuine influenza is a specific febrile disease, which differs widely from common catarrh in the manner of its attack, the course which it runs, and the severity of the impression which its makes on the system. True influenza is both *epi*demic and *en*demic,—that is to say, it prevails occasionally in a widely extended form, and, frequently, in limited local outbreaks. It is not specifically a disease of winter weather, though the influence of a low temperature undoubtedly predisposes individuals to take the disease when it is prevalent. Its attack is characterised by the occurrence of shivering, pains in the limbs, and very distressing headache, chiefly felt

over the eyes, together with severe symptoms of cold in the head, and cough, attended usually with much expectoration. More or less febrile excitement prevails for three or four days, and commonly ends in an attack of diarrhœa; but after the fever has passed away an extraordinary depression of bodily and mental energies remains; and in the case of persons predisposed to consumption or other constitutional diseases it not unfrequently happens that the latent morbid tendency is evoked, and the patient falls into confirmed ill-health. It is this remarkable prostration, and the tendency to the development of constitutional diseases (especially of the tuberculous class) which most distinctly separates true influenza from common catarrh. The popular notion that common colds, if neglected, frequently end in consumption is completely erroneous; for it has been proved, on the one hand,

that consumptive patients are not, in the majority of instances, susceptible to attacks of catarrh; and, on the other hand, extended observation shows that symptoms of consumptive lung disease are almost never evoked by simple catarrh. But influenza, like typhoid fever, leaves a disastrous impression on the whole bodily nutrition; and it too often happens that this is sufficient to call forth hereditary tendencies to tubercle of the lungs which might otherwise have lain dormant during a lifetime. It follows that symptoms of severe catarrh, occurring at a time when influenza is prevalent, ought not to be treated with the indifference which we are accustomed to feel for a common cold, but should be looked upon as demanding immediate medical assistance. For the same reason it is most important that the dangers attending *infection* should be recognised,

and that, on the occurrence of influenza in a household, those members of it who have ever shown a tendency to delicate health, and especially to consumption, should be promptly removed to some other neighbourhood.

In concluding our notice of British epidemics we cannot pass without notice one disease which, though it has never planted itself to any extent in this country, possesses a peculiar interest just now, in consequence of a limited invasion of it which recently occurred. We refer to yellow fever, which a few months since was brought to Swansea by the ship *Hecla*, and infected a limited number of the inhabitants of that town.

Yellow fever is a disease of tropical origin, and is developed in by far the greatest extent in the West Indian Archipelago and on the coasts of the Gulf of Mexico; and it

is now proved to require, for its development to any great degree, the presence of a very high temperature. Nevertheless, it may be carried to European countries by ships; and this has repeatedly taken place; but on such occasions it takes no serious hold upon the inhabitants unless a high temperature be present. The disease derives its name of yellow fever from the occurrence of a peculiar jaundice of the skin, and its Mexican name of *vomito*, from the fact that matters are vomited which consist largely of dark blood. The presence of these symptoms has long caused it to be considered as one of the malarious fevers; but observation has of late convinced many of the best observers that it is in reality a specifically separate malady, not dependent specially upon malaria at all. In truth, it is difficult to read carefully the histories of West Indian epidemics of yellow fever without being tempted

to believe that the disease has strong affinities with our English typhus; and the peculiar symptoms (jaundice and black vomit) of which so much has been made, are in truth phenomena which are not unfrequently witnessed in typhus and in relapsing fever in Britain. So often has this been the case that one can hardly avoid thinking that, were these latter fevers transplanted to the peculiar tropical regions which have been mentioned, they would develop these features with constancy, instead of occasionally, and would then be indistinguishable from true yellow fever. Very much of the specific evidence as to the manner in which the contagion of yellow fever begins and spreads in ships, seems to point in the same direction. And, finally, the very interesting Report of Dr. G. Buchanan, made by the desire of the medical officer of the Privy Council, on the recent events at Swansea,

appears to us to render the likeness of yellow fever to typhus very striking. It is remarked, both by Dr. Buchanan and by Dr. Macdonald, that the poison of yellow fever adheres with great obstinacy to *places;* and Dr. Buchanan shows, in a very satisfactory manner, that at Swansea the *ship* was the infected place which really caused the limited spread of the fever which took place. Around the vessel, as a centre, the fever radiated for a short distance only, and the infected persons seem in every case to have been brought directly or indirectly within the local influence. Now this adherence of virulent contagion to a ship, is excessively like the infection which clings to certain houses in London where typhus has repeatedly occurred; and when we learn that on the removal of the ship from Swansea harbour no more cases of yellow fever occurred, the likeness is rendered still more striking.

It is right to state, however, that this is only our individual opinion, and that Dr. Buchanan himself draws a different inference from the facts which have led us to this conclusion. He remarks that the several persons who seem to have been poisoned by the infected ship did not spread the disease around them in the places where they lay sick, and that this is contrary to our experience of the more contagious diseases, such as typhus, small-pox, &c. For our own part we are inclined to trace this comparative non-communicability of the disease between human beings to the fact that yellow fever is a specific variety of typhus which requires a tropical heat for the full development of its mischievous activity: and also in great part to the speedy and decisive measures which were taken by the authorities for the disinfection of every house which a yellow fever patient had

inhabited. An examination of the very careful and elaborate summary of the cases which actually occurred, which Dr. Buchanan gives in an appendix, makes it clear that several of the sufferers were infected not directly from the ship, but from some person who had himself derived the poison from the vessel, and with whom they had been in close communication. Now bearing in mind what has been said of the special character of typhus contagion—how intensely active it is within a narrow area around the infected person, and how easily it is prevented, by proper precautionary measures, from spreading beyond the limits of a room or a ward—there is nothing surprising, we think, in the fact that the spread of infection was so readily arrested. The facts do, indeed, warrant a strong inference that the poison had not that highly volatile and diffusible character which

belongs to the virus of small-pox or scarlatina, but they do not seem to establish any incompatibility between it and the poison of typhus; rather the reverse, as it seems to us. And we have reason to know that one of the highest authorities on epidemic diseases—Dr. Murchison—inclines strongly to a belief in the existence of a close relationship between yellow fever and typhus.

In concluding this short sketch of the epidemic diseases which are of prime interest to the inhabitants of the British Islands, we must endeavour to sum up those considerations which are of practical value to the public and to statesmen. The following appear to be the chief suggestions towards the prevention and mitigation of epidemic diseases which result from the latest teachings of medical science.

1. As regards the epidemic fevers which, in their severe forms at least, result mainly

from the previous ill effects of privation and distress, a lesson of enormous value has been taught us by the history of the Cotton Famine. The very conditions were here presented under which relapsing fever and typhus have time after time been generated; and yet, thanks to the timely relief afforded by the supply of food and clothing (or money to buy them), and the scarcely less precious moral influence of sympathy, the afflicted populations escaped with but a trifling visitation of this kind of diseases. No sensible person can fail to see in this example a warning to the Legislature that, by wise enactments giving a power of exceptional extension to the administration of Poor Law relief, they have the opportunity of intervening in the very earliest stages of any threatening mischief of this kind, with the effect of preventing a prodigious loss of lives.

2. Of all the measures which are adapted to check the progress and spread of contagious diseases, there are none which are comparable in value to the early isolation of the patients, and their treatment in apartments, the ventilation of which is exceptionally free, while as little as possible of woollen or other stuffs which may retain the poison of the disease is employed in the way of furniture. In the case of scarlatina and small-pox it is necessary not merely to do this, but to remove all the non-infected persons (who are not "protected" by a previous attack) from the house. It is accordingly of the greatest moment that the premonitory symptoms of all contagious diseases should be known to the public themselves: this is not a matter which the medical profession wishes, or would think it right, to make any mystery about; on the contrary, medical men would gladly see

all persons, especially all mothers and heads of households generally, in possession of a sound working acquaintance with the value of premonitory indications, and especially of such infallible criteria of the severity of threatened mischief as are supplied by the indications of the thermometer. It would also be highly desirable that the study of really good pictorial representations of the characteristic eruptions of the contagious fevers should become general amongst women of every class: there is no fear that the public would be terrorised by this, on the contrary, many needless alarms which now occur would be avoided by a fuller knowledge of this subject than is at all commonly possessed by mothers of families; while at the same time many a life would be saved by the timely separation of infected persons from their companions.

3. With regard to such diseases as depend

for their propagation on the contamination of air and of drinking-water by sewage matters, it is certain that the means of prevention may be applied, if the Legislature has any real desire to act earnestly, with the best prospects of success. It is certain that typhoid fever might be exterminated by the compulsory provision of a complete system of drainage on the one hand, and of pure water supply on the other. It is highly probable that the same precautions would render anything like a severe outbreak of the Asiatic form of cholera impossible; and that the severe epidemics of diarrhœa which give such a fatality to the autumn season might be extinguished.

4. The evil influence of overcrowding is assuming gigantic proportions, and cannot, without much peril, be treated any longer on the do-nothing system. Either by Government interference or by private en-

terprise a large proportion of the operatives who work in London and other great cities ought to be provided with proper and wholesome apartments, built in blocks, and furnished with sanitary appliances, near the scene of their labours, or else they should be induced to take suburban residences, and arrangements made by which they might be transported to their daily work by railways. If some system of this kind be not commenced very soon, typhus fever, which has already changed from an occasional visitor to an accustomed domestic scourge, in London, will become more and more rooted in its favourite haunts, and may not impossibly take some more malignant type, such as that of the Oriental plague, of which it is probably a mere modification. Nor can any one assume that it will continue in such changed circumstances to be a disease almost confined to the poor: on the contrary, it

may very probably extend its ravages to all classes of the community in our crowded cities.

5. It is intolerable, in view of the facts which have been briefly narrated in the present paper, that the management of sanitary matters should be any longer committed to the vestries, as those bodies are constituted at present. Even if we credit them with the purest and most disinterested motives, it is impossible, with their limited and confused views of scientific questions, that they should grapple adequately with problems of such deep importance as the reduction of overcrowding, the supply of really pure drinking-water, and the immediate isolation of cases of infectious disease. It is true that they could not be expected to do this thoroughly, in any case, until they had received larger compulsory powers than Parliament has as yet put into their hands.

But the best proof of their incompetency for their duties is the very fact that these legal difficulties remain and yet no action takes place on the part of the vestries, with a view to secure parliamentary authority for carrying out the necessary reforms.

Here we must leave our subject. We have placed in the hands of those who have been at pains to read this little treatise carefully, a series of facts which point to the most urgent duties resting upon all members of the community who have the slightest influence in the management of local affairs, or the smallest power of moving Parliament. It is the simple truth that on the rapidity with which we may be able to introduce the more important of those sanitary improvements which tend to exterminate epidemic diseases, will depend very much of the greatness or feebleness of England as a nation during the next half-

century. It will not do to flatter ourselves with considerations of the reduced rate of mortality that was undoubtedly caused by sanitary reform in the flush of its youth, with such a fact under our eyes as the localization and steady increase of typhus in London, and in many other large towns. The influence exerted on the labouring populations of crowded towns by the constant presence of such a disease as typhus, and by the havoc committed among their families by other epidemic diseases, is not merely disastrous to life, but highly demoralizing, because it originates such a sense of the insecurity of life as tends to render the lowest classes more and more reckless, and more and more incapable of raising themselves from their debased condition. Few are aware to what a length we have already gone, in this metropolis, towards the creation of a "dangerous class" by our neglect of the

most obvious facts in connection with the growth and "improvements" of London. Assuredly, if we shut our eyes much longer to the dangerous tendencies of the present state of things, we, or our immediate successors, will have occasion bitterly to regret our folly. But it is not enough to feel these truths, and to attempt to carry out their sense, unless we are possessed of a fitting organization for the purpose: and we would take this occasion to enforce the urgent necessity which exists for the formation of a general State Medical Department, which among its other duties might, by constant vigilance and united action, enable the sanitary questions which arise out of the rapid growth and alterations constantly taking place in the various centres of population to be settled satisfactorily without loss of time. It is our *slowness of action* which is so perilous: and any statesman who would

for a moment consent to postpone the business of making declamations for or against reforms of the electoral franchise, and devote his talents to the organization of a really authoritative medical direction of sanitary reforms, would deserve the sincere gratitude of his country.

It may be well to say a few words, perhaps, on the subject of a temporary and immediate expedient which has occurred to many as desirable at the present time: we mean the appointment of a Commission to investigate the sanitary state of the kingdom, with a view especially to prepare for, and as far as possible mitigate, the expected attack of cholera. We heartily desire that this scheme may be carried out without loss of time; and we know of only one objection which any reasonable man can make to it, viz., that it is one of those measures which an ignorant and apathetic public is too apt

to think definitively and finally *curative*. By all means let us have a commission, composed of the ablest scientific men; but, above all things, let us remember that this ought only to be looked on as a stop-gap, and that our preparations and exertions and efforts, for the establishment of a permanent sanitary organization of a thoroughly satisfactory kind, ought never for a moment to relax.

One parting word may properly be added on the subject of the "curability" of the epidemic fevers. It is important that the public should understand that the majority of these diseases have a definite minimum duration which nothing can alter, that their natural tendency is, on the whole, to a favourable termination, and that the best and most enlightened physicians are the most firmly convinced that there exists no practicable means of shortening the natural term of

these maladies. Therefore, when we speak of "cure" by medical treatment, we mean no more than this: that the interference of a vigilant and skilful physician frequently prevents the patient from sinking under the disease before it has run its natural course, or averts some of those evil consequences which are apt to follow when the patient was previously in delicate health or was affected with latent tendencies to constitutional disease. It is perhaps a matter of doubt whether the erroneous popular notions on this point, which attribute to the skilful physician the power of cutting short the most acute fevers with a few doses of medicine, have not exercised as disastrous an effect on medical science as in the confidence of patients in their advisers. Unconsciously and involuntarily medical men have been sometimes tempted by the urgent desires of their friends for *speedy* relief to the sufferer

and for his immediate deliverance from danger, to spend their energy upon the weakest, and to neglect the strongest part of the defence against disease. It can never be too often repeated that by far the most difficult and scientific portion of the medical man's task in the treatment of acute disease, is the direction of hygienic measures, and above all the apportionment of the proper food, and the exact manner in which that food shall be taken: and that these are the means by the right employment of which the physician saves his patients in ninety-nine out of a hundred cases which recover from dangerous attacks of epidemic disease.

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